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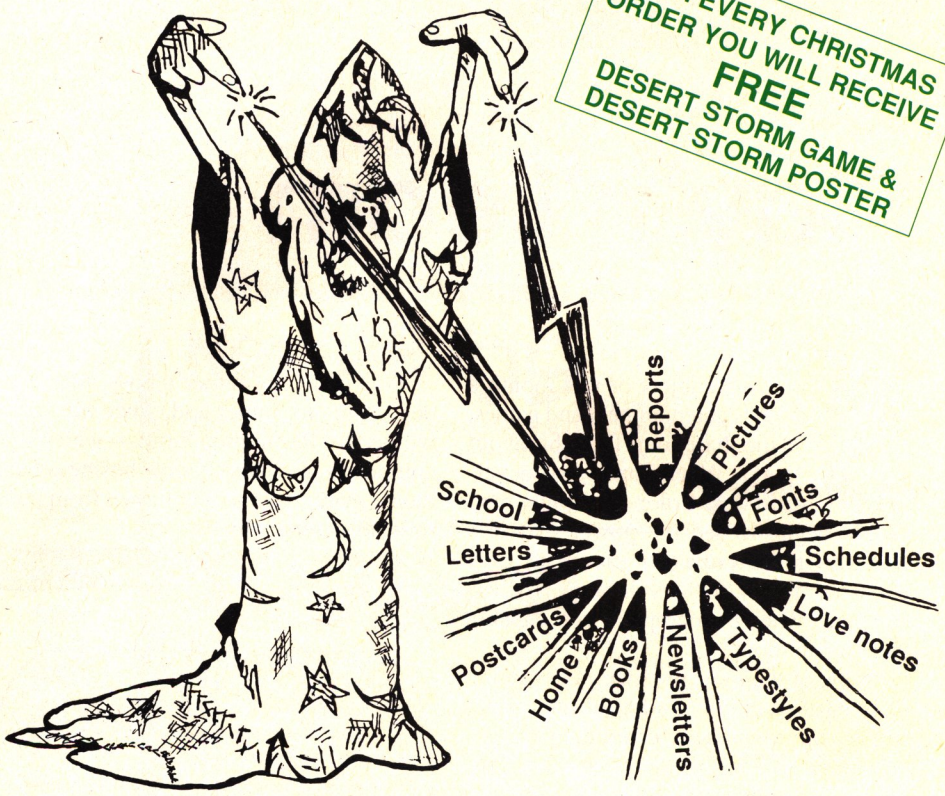

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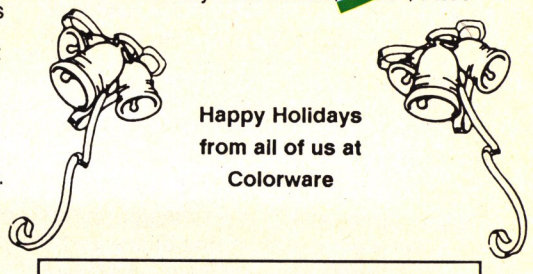

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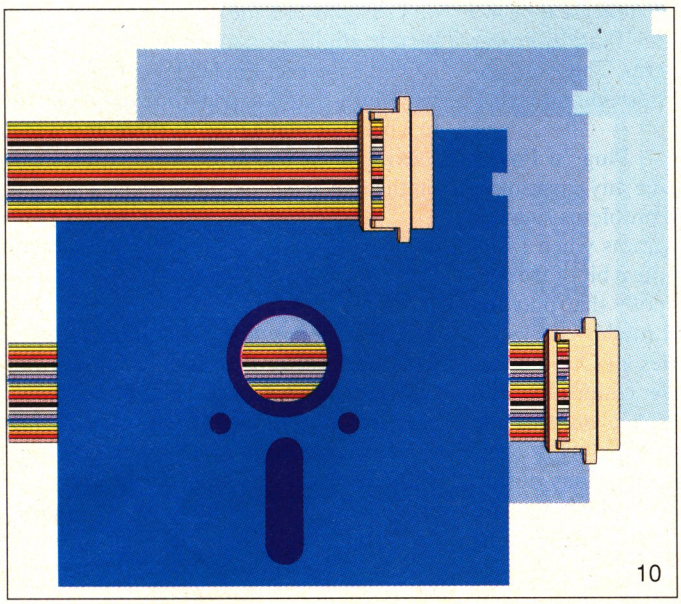

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Letters to the RAINBOW

CoCo 2 Compatibility

Editor:

In "Letters to THE RAINBOW" (October 1991, Page 4) two people indicate they are having problems using the Plug 'n Power controller with their systems. There may be a poke that will enable these units to work with the CoCo 3.

I don't have access to Plug 'n Power equipment, so I can't give any guarantee. However, I experienced problems running several commercial programs when I first got my CoCo 3. After quite a bit of frustration, I learned about a poke that puts the CoCo 3 into the CoCo 2 mode.

`POKE 65502,0` disables all CoCo 3 features, making the computer compatible with the CoCo 2. `POKE 65503,0` enables the CoCo 3 features.

This solution may work, it may not. In any case, it might help others who are having problems running CoCo 2 programs on their CoCo 3's.

Ken Yarley
1091 Belford Avenue
Columbus, OH 43207

Thanks for the information. While the poke you mention does enable some CoCo 2 programs to work on the CoCo 3, the main problem with using the Plug 'n Power controller involves the CoCo 3's lack of support for the semi-graphics modes of the CoCo 1 and 2. The software for the controller is designed to run in these modes.

Checking the Situation

Editor:

I have to write numerous checks each month to the same listing of vendors, but with amounts that vary from month to month. I am looking for a program that prints monthly checks and, if possible, maintains a running total that I can reconcile with my checking account. I am using a 64K Color Computer. Can anyone help me find a program that meets these requirements?

H. James Schroeer
3424 Valley Creek Drive
Tallahassee, FL 32312

Prodigal Son

Editor:

After about a year of absence, I have returned home to THE RAINBOW to enhance my enjoyment of the CoCo 3. It feels good to be back.

Can you tell me where to find a still-picture digitizer similar to those for MS-DOS computers? I'm talking about the hand-held units that you just glide over a picture in a book or magazine? Is there any way of making those for the PC-compatibles work on the CoCo 3?

Charles Hulen
1309 Hart Avenue
Lawrenceburg, TN 38464-2218

The most popular video digitizer for the CoCo is the Microworks DS-69. Then there is Rascan. However, no vendors we know of currently *offer a hand-held unit like those used with MS-DOS machines. Chris Burke of Burke & Burke demonstrated, at the most recent Chicago RAINBOWfest, an interface he designed to go between such a digitizer and a CoCo 3 running OS-9. You might give Chris a call.*

Elliott, Elliott, Elliott

Editor:

Thank you for printing *Country* in the September 1991 issue of THE RAINBOW. When I opened the magazine and saw my program, I was very happy. However, you spelled my name wrong three times! Now, I'm sure you'd be more than happy to print an apology and a correction in the next issue.

Phil Elliott, Jr.
1211 S.W. Emma
Des Moines, IA 50315

We apologize for spelling your name incorrectly, and we hope your letter will be correction enough.

Building Up

Editor:

I started using the CoCo in 1985. My current CoCo 3 system uses a separate keyboard, an internal switching power supply, a 3½-inch 80-track floppy drive and a 3½-inch 20-Meg hard drive. The computer, drives and power supply are inside a homemade 2½-inch rectangular cover on the lower part of the original CoCo 3 case.

OS-9, along with *Multi-Vue*, provide the operational "glue" that holds the system

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together. All my "old" BASIC programs work with Burke & Burke's *RSB*, and those that I still use are in their own directories on the hard drive.

As you can tell, I enjoy working with the system. I have taught my three sons how to use *Window Writer*, *VI* (*TSEDIT*), *Profile* and many other programs. They will be ready for UNIX on their own computers because of OS-9 and the CoCo.

In the meantime I am looking for a new or used copy (original package only, with documentation) of the relational-database, *Sculptor*. I am also looking for the *OS-9 Development System* (Cat. #26-3032). Can you help?

Harold Mech
5601 Cresta Luna Court NE
Albuquerque, NM 87111

You may be able to get both packages through CoCo PRO! In addition, you might try Tandy's Express Order service for the OS-9 Development System.

A Printer for the ST

Editor:

I have a DMP-130A printer. I want to know if I can hook it to an Atari 1040 ST and make it work.

Peter Cortes
170 Belmont Blvd.
Elmont, NY 11003

As long as you have a standard parallel-printer port on the ST (we don't have access to an Atari), there should be no problem using the DMP-130 with it. Otherwise you may have to make a special cable.

Keyboard Templates

Editor:

Where can I purchase a keyboard template for my CoCo 3? How much does such a template cost?

Paul Knudsen
227 Barbara Lane
Steger, IL 60475

You can purchase a variety of keyboard templates from P&M Products, 1003 Shalimar Drive, High Point, NC 27262, (919) 887-2236. The cost is $6.95 plus $2 S/H.

Help From Abroad

Editor:

Many congratulations for your birthday! The CoCo lives and flourishes in Europe. Can you help me with the following problems? First, I cannot get *Home Publisher* to run. Radio Shack has ignored my queries. Second, I have OS-9 Level II but have done nothing with it yet. I have the CoCo 3 and one floppy drive. Do I need a second drive for OS-9? If so, can I use my present controller and drive, or do I have to start all over again? Finally, can the CoCo be connected to the Canon BJ-10E Bubble Jet printer?

David Burkhart
Hauzenberger Strasse 20/X111
W-8000 Muenchen 21
Germany

OS-9 doesn't require that you have two disk drives, but it helps if you do. Several RAINBOW advertisers offer second drives for existing Drive 0 systems. We are unfamiliar with the Bubble Jet. Perhaps another reader can offer advice on that.

Needs Help Booting OS-9 From HD

Editor:

I want to boot OS-9 directly from a hard drive, as stated in THE RAINBOW (March 1989, Page 55), but the manual doesn't indicate how to do this. I bought RGB-DOS from CRC Computers at the same time I bought my hard drive, but they have not been able to help me. I have also written to RGB Computers, but the letters have been returned. Can anyone help?

Claude Cote
660 Labarre
Hebertville, PQ G0W 1S0
Canada

Adding a Second First Drive

Editor:

I have a CoCo 3 with an FD-502 Drive 0 system. I recently bought a second Drive 0 (also an FD-502), and I was assured by the salesman that I could use it as a second drive in my existing system. After I had it installed, I attempted to format a disk. When I entered `DSKINI1`, I got an I/0 error message. I then tried formatting a disk on Drive 0, and the lights on both drives came on and the drives would not stop running. I had to shut the system off to stop them. I went back to the Radio Shack salesman to get help and advice, but he couldn't tell me what was wrong. Can a primary Drive 0 be used as a secondary drive, and if so, how? I need to know as soon as possible since I've ordered software that requires two drives.

Victor Almeyda
845 Bergen Ave., Suite 350
Jersey City, NJ 07306

Most likely both drives are still set to act as Drive 0. There should be a set of jumpers on the rear of the drives where the cable connects to them. On Drive 0, the jumper should be set to DS0. On Drive 1, make sure the jumper is set to DS1. For more information about adding disk drives, see "Disk Drives and the CoCo" (March and April 1990) by Marty Goodman.

Where There's a Will . . .

Editor:

I've had my CoCo only a year now. I'm not much of a programmer, but I use my CoCo 3 with a shortwave radio to decode RTTY and FAX signals. I needed a way to get my list of over 250 radio frequencies in numerical order, and after a few unsuccessful tries at writing a program to do this, I discovered the CoCo could do it without a program!

I simply entered the different frequencies (all four- or five-digit numbers) in random order, along with station IDs as remarks (i.e., `1017 'BAF, Beijing, China`). The CoCo interpreted this as a BASIC program. When I enter `LIST`, the log appears onscreen in numerical order.

To refine the list, I save the file in ASCII, then reload it into *Max-10*. This makes it easy to edit, and I can print the list in a neat, three-column format.

Dave Maunder
Box 38
Brigus, NF A0A 1K0
Canada

That sounds like a very interesting and excellent solution. But then, CoCo users are known for their ingenuity.

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, 9509 U.S Hwy 42, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

Print#-2

What Will 1992 Bring?

Who could ever have predicted the events of 1991? Well, we were fairly sure about this time last year there would be a war in the Persian Gulf — but could even the most optimistic of us have guessed that it would have provided such a stunning and rapid victory for the Allied forces? I do not think any of us could.

Of even more significance, who could possibly have predicted the rapid changes in the Soviet Union? Yes, there were signs. But that was all. That the breakup of that vast country could occur so rapidly — even with the one-year-old history lesson we learned last year in Eastern Europe — has been nothing short of astonishing. I happen to think that, with the exception of the abortive coup in Moscow, the easy part is over.

Even now, as we in the West prepare to celebrate our Holiday season, there is little food available in the Soviet Union. Even less will be available by Spring, when the cold Russian Winter begins to loosen its grip. Will that bring anarchy to the Soviets? I happen to think there is a good possibility of that happening.

None other than Vladimir Lenin, the catalyst of the Russian revolution of 1917, once said something to the effect that all he needed to overthrow the government was one printing press. Lenin said this because the most important single thing a revolutionary can do is communicate with his followers — or those he wants to be his followers.

This, in effect, goes back to the old philosophical question of whether a tree, falling in the forest when no one is around, makes a sound. If the tree crashes to the forest floor but no one hears it fall, it, for all purposes, does not make any noise; if you decide to foment rebellion and cannot communicate with your followers, there will be no followers to lead.

Computers are the ultimate means of communication.

Revolutionaries have been using one means or another to communicate for a long time. Martin Luther, as an example, didn't just have things to say about the Roman Catholic Church — he nailed his 95 Theses onto the door of the cathedral at Wittenberg in 1517 so everyone could read them. Thomas Paine, in his pre-1776 campaigns against George III, used pamphlets extensively to address the Colonies' grievances against the crown. Where would Ghandi's civil disobedience protests have led India without extensive coverage in the media of the day?

It is interesting, perhaps, to note that, with the exception of Moses' rebellion against pharaoh, the popular revolutions of history — those involving a large number of people rather than small "palace" groups — essentially antedated the invention of the printing press.

Does this have anything to do with computers? Of course. Computers are the ultimate means of communication. Whether we use large mainframe-based systems such as Delphi or CompuServe, whether we log on to local bulletin boards, whether we just use the "host mode" of some communications programs to transfer files or converse, computers have the ability to move vast amounts of information between large groups of people in record time.

Add word processors and, if you will, page-layout programs, and you have the ability to communicate pretty easily. You can make newsletters and banners, political signs and broadsides. Tom Paine would have been in hog heaven with a computer and a dot-matrix printer.

The most civilized yet least computer-intensive nation in the world is the Soviet Union. Yet, computers and computing are making more and more inroads there every day. And I believe technology will be easier for the Soviets to come by in the future — a direct result of the demise of the "evil empire."

What this will mean in the near future is that every Soviet splinter group that has something to say will have the means to communicate it to those who believe similarly. As that happens, unfortunately, there will be continued unrest in that vast and unhappy country for several years.

Although unrest is not a happy thought, it does mean more information will flow back and forth. Russia's two "greats," Peter and Catherine, sought more open communication with the West. With the computers that will be increasingly finding their way into the people's hands in the Soviet Union, there will certainly be more communication in 1992 — and, happily, more freedom as well.

—Lonnie Falk

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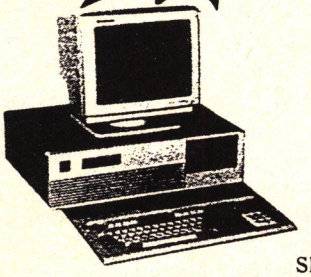

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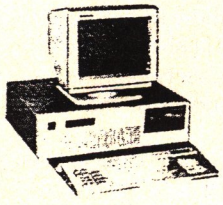

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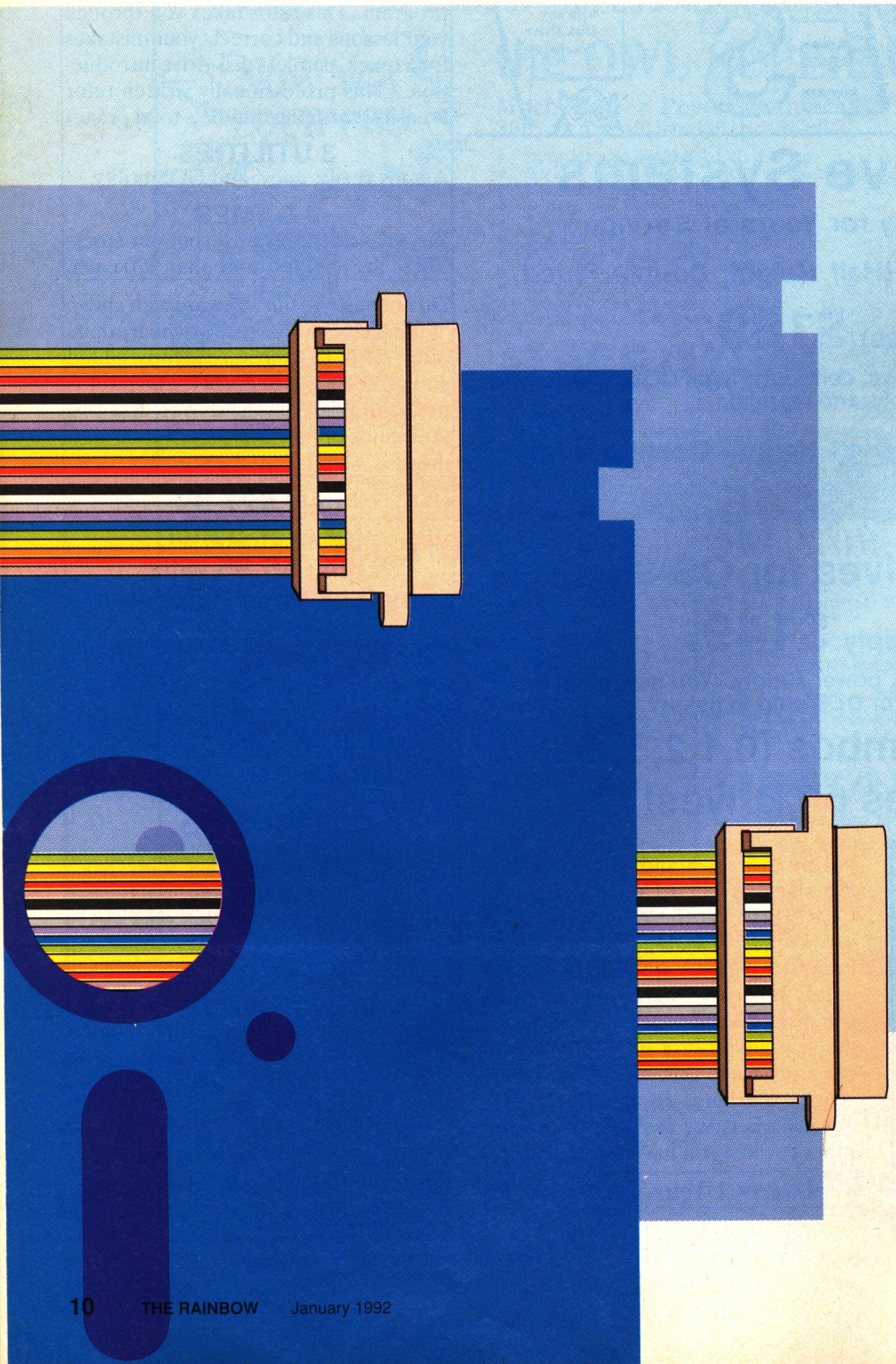
Archiving Files

by Tim Kientzle



The terms *archiving* and *compression* are tossed about a lot in the computer market, yet many people are not quite sure what they mean. It seems reasonable to address these topics and help people understand the terms, the functions and what to expect from programs that use them. Let's first clear the air by defining what each of these terms mean, and what some of the common misconceptions are. Then we'll look at an OS-9 program to unarchive TC-format archives created with Disk BASIC.

File Compression

Intuitively, the term *compression* simply means "making something smaller." For computer applications, this means encoding a file so that it occupies less space (fewer bytes) than the original. Ideally, for any given compression routine there should be a decompression routine that decodes the file into its original form.

There are many reasons why compression is desirable. The most obvious is that compressed files require less space on a disk, thus allowing you to store more data on each disk. Also, people who transfer files by modem can appreciate the fact that compressed files take less time to transfer. Both of these uses can save money, in the first case by reducing your disk space needs, and in the second by cutting down on long-distance telephone bills and connect-time charges.

A complete understanding of compression requires a good deal of mathematics, and we won't get that detailed here. (For a more complete discussion of graphics compression techniques, see my series on "Displaying Picture Files" in the October through December 1990 issues of THE RAINBOW.) However, there are some situations for which certain compression techniques work best, and there are a few limitations with compression programs in general. It is important that you understand these situations to make efficient use of compression programs.

No compression program can shorten every file. Well-written compression pro-

Tim Kientzle is currently pursuing a doctorate in mathematics at the University of California at Berkeley. He is the author of V-Term *and has worked with the Color Computer since 1982.*

grams will try to compress a file, but will quit if the compressed file would be larger than the original. (Yes, this can happen.) The amount of compression you can expect depends on the type of data and the compression method used. For example, run-length encoding (RLE) works well for simple graphics files but not as well for text files. Huffman encoding works well for text files. On the other hand, Limpel-Ziv-Welch (LZW) compression works well for most graphics files. Few methods perform a very good job of compressing executable programs.

It is also important to remember that file compression takes time and memory. (The popular Unix program `compress`, for instance, is only 25K, but requires over 400K of memory to run.) These requirements are a major reason why compression methods are not more widely used.

File Archiving

As the term applies here, *archiving* means packing several files together into a single file that can be unpacked later. An important application of this procedure is to combine groups of files before transferring them over a modem — it is almost always easier and faster to transfer one large file than to transfer many small files. Another common use is for backing up hard disks onto floppy disks or tapes in order to improve speed and to make more efficient use of the disk or tape.

To be useful, archiving programs must store a lot of information about the files that are archived. At a minimum, they should store the filenames. More sophisticated programs store the file types, the directories where the original files were stored, the dates on which the files were created, the owner IDs of the files, the files' permissions, and other relevant information. (Not all of this information applies to Disk BASIC, of course.)

Today most good archiving programs also support some form of file compression. As I've mentioned, given a choice, you should compare the compression obtained from several programs, keeping in mind such factors as speed and ease of use. No program is useful if you *won't* use it because of difficulties with the way it works.

A Case Study

John Lauro created *The Compressor* (also known as *TC*), which is currently the

OS-9

The Listing: `UnTC`

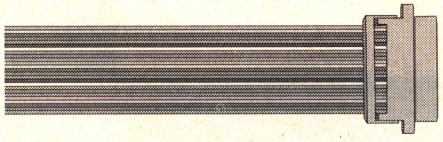
```
/* UnTC
 *
 * Unarchive archives created by John Lauro's TC RSDOS archive programs
 *
 * Usage: untc [-d] [files ...]
 *
 * Options:
 *    If -d is specified, untc will display a directory of all
 * files in the archive(s).  If no option is specified, it will extract
 * all files from the archive(s).
 *
 * General file format:
 *    A TC-format archive consists of a series of entries of the following
 * form: a one-byte sequence number, denoting which file this is in the
 * archive starting at one (this sequence number is also used for EOF
 * detection); a header for each file of the format outlined in TCHeader,
 * below (all existing TC programs use a version number of 1)
 * followed by the file data itself.  Further information on the
 * compression can be found in the comments at the beginning of the
 * uncompress() function.
 *
 * Contributed to the public domain by Tim Koonce Kientzle.
 */

#include <stdio.h>
#include <ctype.h>

struct TCHeader { char name[8];   /* RSDOS file name */
                  char ext[3];    /* RSDOS extension */
                  char type;      /* RSDOS file type */
                  char ascii;     /* RSDOS ascii flag */
                  char version;   /* Must be 1 */
                  char length1;   /* First byte of three-byte length */
                  int  length;    /* Length of file in archive */
                  char marker     /* Type of compression used */
                };

main(argc,argv)
int argc;
char *argv[];
{
   FILE *infile;        /* The input file */
   int dir=0;           /* Set to non-zero if we're just listing a dir */

   pflinit();   /* So the long-integer printf routines will be linked */

   if ( argc==1 )  usage();  /* Usage message if no arguments given */
   else
      while(--argc > 0) {       /* For each file */
          ++argv;
          /* If it's "-d", then turn on "dir" flag */
          if( (*argv)[0]=='-' &&  ( (*argv)[1]=='d' || (*argv)[1]=='D'))
              dir=TRUE;
          else
              if ((infile = fopen(*argv,"r"))) {  /* Open the file */
                  if(dir)  directory(infile);       /* Print directory */
                  else     unpack(infile);          /* Unpack the file */
                  fclose(infile);                   /* Close the file */
              } else
                  printf("UnTC: Can't open '%s'.\n",*argv);
      }
}

/* Display usage message */
usage()
{
    printf("UnTC: extract TC-format archives.\n\n");
    printf("Usage:  untc [-d] [archive_name ...]\n\n");
    printf("Options:\n");
    printf("  -d     Give directory of specified archives.\n");
    printf("  If no options are given, extract all files from archives.\n\n");
    printf("Released into Public Domain 5Nov89.  Author: Tim Koonce Kientzle\n");
    printf("Based on TC3 by John Lauro.\n");
}

/* Display a directory for a TC3 archive  */
```

most popular archiving/compression program for Disk BASIC. The drawbacks of the simple compression method *TC* uses are outweighed by the fact that it is fast and easy-to-use, and it is available in versions for the CoCo 1 and 2 (TC12), the CoCo 3 (TC3) and the 512K CoCo 3 (TC31). All three programs read and write the same files. The difference is that the CoCo 3 versions can handle larger archives.

Archiving makes it much easier and faster to transfer files via a modem.

Because of *TC*'s popularity and because many Disk BASIC users also use OS-9, I wrote a decoding program for *TC* files that runs under OS-9 (see the listing). Since the format of *TC* archives is fairly simple, it makes a good case study of how archiving programs work.

A *TC* archive consists of a series of entries for each file in the archive. Each file is stored with a header that contains a sequence number for the file, the filename, fundamental Disk BASIC directory information, the version of the file format, the size of the file, and the type of compression used. The actual file data follows this header. Compressed files are stored using a form of run-length encoding that uses an "escape byte" to mark encoded runs in the data.

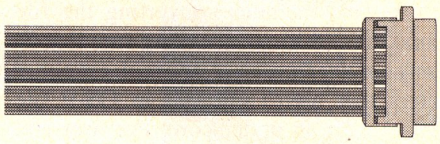


Three of the header fields deserve some special discussion. The *sequence number* simply counts the file's position in the archive. (Sequence Number 0 is used to mark the end of the archive.) The sequence number serves as an error check to make sure the file is valid and also as an end-of-archive check. Having some code within the archive to mark the end is a useful way to guard against one common source of

```
directory(infile)
FILE *infile;
{
    struct TCHeader TCH;
    int next;
    int sequence;
    int i;
    long size;

    printf("Filename.ext   Type/ASCII   Compressed?     Archive length.\n");

    /* Keep going as long as the sequence numbers match up */
    for ( next=1; sequence=getc(infile) ; sequence == ++next)
    {
        fread(&TCH,sizeof(TCH),1,infile);  /* Get one header */
        if (TCH.version != 0x01)
        {
            printf("Warning: file compressed with an incompatible");
            printf(" version of TC.\n");
        }
        for(i=0;i<8;i++) putchar(TCH.name[i]); /* print filename */
        putchar('.');
        for(i=0;i<3;i++) putchar(TCH.ext[i]);  /* print extension */
        size = (TCH.length1 & 0xff) * 0x10000L + ((long)TCH.length & 0xffffL);
        printf("    %2d     %1c%8s%3s%16s%6ld\n",TCH.type,
            TCH.ascii+'B'," ",TCH.marker?"Yes":"No"," ",size);

        for(i=0; i< TCH.length ; i++) getc(infile);  /* Skip the actual file */
    }

    /* After all the files must come a zero sequence number */
    if (sequence != 0) printf("UnTC: Error in file!\n");
}

/* Unpack an archive */
unpack(infile)
FILE *infile;
{
    struct TCHeader TCH;  /* Header of the file */
    int next;             /* Expected sequence number of next file in archive*/
    int sequence;         /* Actual sequence number of next file */
    int i;                /* Counter variable */
    char filename[32];    /* Output filename */
    FILE *outfile;        /* Output file handle */
    long size;            /* Size of file in archive */

    for ( next=1; sequence=getc(infile) ; sequence == ++next) {

        fread(&TCH,sizeof(TCH),1,infile);
        size = (TCH.length1 & 0xff) * 0x10000L + ((long)TCH.length & 0xffffL);

        printf("Decoding RSDOS file  \"");

        for(i=0;i<8;i++) putchar(TCH.name[i]); /* Print the RSDOS filename */
        putchar('.');
        for(i=0;i<3;i++) putchar(TCH.ext[i]);

        convert_name( filename, TCH.name, TCH.ext);

        findname(filename);
        printf("\" to OS9 file \"%s\".\n",filename);

        if(outfile=fopen(filename,"w")){
                decode(infile, outfile, size, TCH.marker);
                fclose(outfile);
        } else {
                printf("UnTC: Couldn't open %s.  Skipping file.\n",filename);
                for (i=0; i<TCH.length; i++) getc(infile);
        }
    }
    if (sequence != 0)
        printf("UnTC: Error in file! -- Incorrect sequence number.\n");

}

/* Make sure file with this name doesn't already exist.
 *
 * If one does, change the filename to a name that isn't already used
 * by adding '.0', ... , '.9' to it until we get a name that isn't used.
 */
findname(fname)
char *fname;
{
   char *p;
   FILE *tmp;

   for (p=fname; *p != '\0'; p++)
               ;
   if (tmp = fopen(fname,"r")) {   /* If it already exists */
      fclose(tmp);                 /* close the file */
      *p++='.';                    /* Append  .0 */
      p[1] = '\0';
```

```
        for ( *p = '0' ; tmp = fopen(fname,"r") ; (*p)++ )
                fclose(tmp);
    }
}

/* Convert RSDOS filename to acceptable OS9 filename
 * Filenames beginning with a non-alphabetic char get 'tc_' prepended.
 * Illegal chars are converted to underlines.
 */
convert_name( os9name, rsname, rsext)
char *os9name, *rsname, *rsext;
{
        char *p;
        int i;

        p=os9name;
        if (!isalpha(*rsname)) { *p++ = 't'; *p++ = 'c'; *p++ = '_'; }

        for(i=0; i<8 ; i++){
            *p = rsname[i];
            if (isupper(*p))  *p= tolower(*p);
            if (!isalpha(*p) && !isdigit(*p) && (*p != '.'))
               *p='_';  /* Convert illegal chars to underlines */
            p++;
        }
        while (*--p=='_')  /* backup before _ chars */
            ;
        p++;
        *p++ = '.';       /* Add a period to separate the extension */
        for(i=0; i<3; i++){
            *p = rsext[i];
            if (isupper(*p))  *p = tolower(*p);
            if (!isalpha(*p) && !isdigit(*p) && (*p != '.'))
               *p='_';  /* Convert illegal chars to underlines */
            p++;
        }
        while (*--p=='_')
            ;
        *++p = '\0';
}

/* Decode one entry in the archive
 * Marker value determines type of compression used.
```

errors: "junk" information being appended to the end of the file. Such junk is commonly a result of transferring files using Xmodem or Ymodem protocols.



The *version number* is the version number of the file format, not the version number of the program. While there have been at least three different *TC* programs, they all use exactly the same file format, and so the version number is always a one. This type of version marker is very common and is very rarely changed.

The *compression type* information is used to indicate how the file data is stored. *TC* currently stores data either uncompressed or by using a form of run-length encoding, whichever results in a smaller archive. Allowing the data to be stored uncompressed has two nice benefits: It is a "last-resort" if none of the compression methods can successfully shorten the file, and it makes it easy for other programs to create *TC*-format files.

The C program I wrote to decode *TC* archives is heavily commented, so I will only make a few comments about it here.

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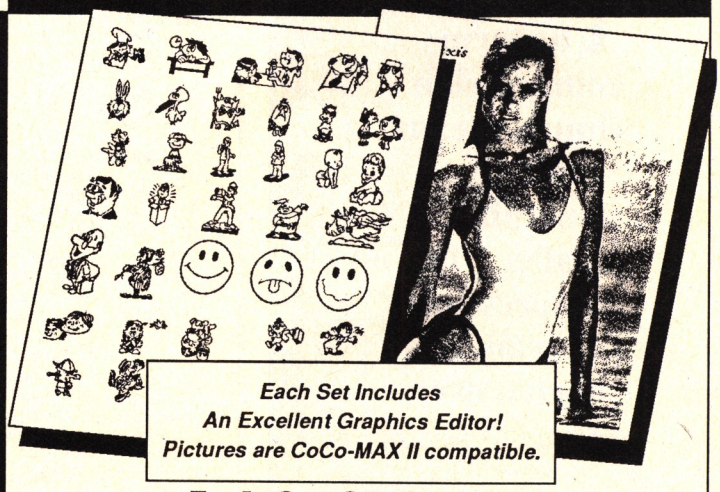

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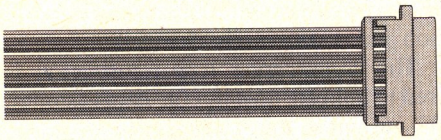
Since OS-9 has fairly strict requirements on the format of filenames, UnTC includes a routine that converts the Disk BASIC filenames into something more familiar to OS-9. This includes converting the filename into lowercase, making sure that the first character is a letter, and replacing characters that aren't allowed in OS-9 filenames with an underscore. For user convenience, the program is also careful to not overwrite files that already exist, unlike many other OS-9 programs that overwrite existing files without any warning. Both of the routines, convert_name and findname, may be useful to other OS-9 programmers.



RAINBOW ON DISK

Included on the Disk BASIC side of this month's RAINBOW ON DISK are TC12, TC3 and TC31 by John Lauro. These three versions of *TC* are distributed as shareware — if you use any of them, please have the courtesy to read the documentation files and register the software. We appreciate Mr. Lauro's gracious permission to provide you with these programs in this manner.

The term compression simply means "making something smaller," but no compression program can shorten every file.

Along with the OS-9 *TC*-decoder program, UnTC, the OS-9 side of this month's RAINBOW ON DISK includes ar, Version 1.3. Written by Carl Kreider, ar has become the most widely used archive/compression program available for OS-9 Level I and II. We thank Mr. Kreider for his permission allowing us to provide you with this excellent OS-9 program. ❑

```
 *   0 -> No compression
 *   1 -> RLE compression used
 */
decode(infile,outfile,length,marker)
  FILE *infile, *outfile;
  long length;
  int  marker;
{
  if(marker==0)      copy(infile,outfile,length);
  else if(marker==1) uncompress(infile,outfile,length);
  else               printf("UnTC: Unrecognized compression type %d.\n",marker);
}

/* Copy length bytes from infile to outfile
 * Used by uncompressed files
 */
copy(infile, outfile, length)
FILE *infile, *outfile;
long length;
{
   int byte;

   for (;length>0;length--) {
      byte = getc(infile);
      putc(byte,outfile);
   }
}

/* Uncompress a compressed entry
 *
 * Compression format:
 *   First byte is a reference value, 'ref'.
 *   Any byte other than 'ref' represents itself.
 *   Occurences of 'ref' mark sequences encoded in one of the following
 *         formats:
 *
 *      ref,0                encodes a single occurence of ref
 *      ref,1,cnt,val        encodes cnt+256 occurences of val
 *      ref,2,cnt0,cnt1,val  encodes cnt0*256+cnt1+512 occurences of val
 *      ref,cnt,val          encodes cnt occurences of val, cnt > 3.
 *   Note that ref,3 is illegal.
 */
uncompress(infile, outfile, count)
FILE *infile, *outfile;
long  count;
{
     int reference;
     int i;
     int repeat;
     int val;
     int byte;
     int type;

     reference =getc (infile);  /* First byte of data is reference byte */
     count--;

     while (count >0) {
         byte = getc(infile);
         count--;
         if (byte != reference) putc(byte,outfile);
         else {
            type = getc(infile);
            if (type == 0 ) {
               putc(byte);
               count--;
            }
            else if (type==1) {
               repeat = 0x100 + (getc(infile) & 0xff);
               val = getc(infile);
               for (i=0; i<repeat ; i++) putc(val,outfile);
               count -= 3;
            }
            else if (type==2) {
               repeat = 0x200 + ((getc(infile) & 0xff)*256);
               repeat += (getc(infile) & 0xff);
               val = getc(infile);
               for (i=0; i<repeat ; i++) putc(val,outfile);
               count -=4;
            }
            else if (type==3) {
               printf("UnTC: Error in decoding file... illegal file format.\n");
               exit(1);
            }
            else {
               repeat = type;
               val = getc(infile);
               for (i=0; i<repeat ; i++) putc(val,outfile);
               count -= 2;
            }
         }
     }
}
```

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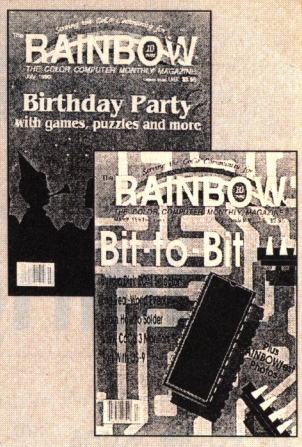

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RAINBOW INDEX
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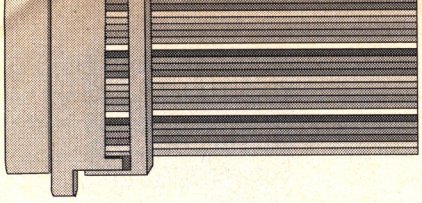

Editing Submissions

by Eddie Kuns
OS-9 SIG Database Manager

In the past two months, I have guided you through the process of uploading files to Delphi. The information I've presented so far is sufficient when everything progresses smoothly. Sometimes, however, something goes wrong: An upload fails, you make a typo, or you change your mind about what you want to name the group or a file within the group.

You may have just finished submitting the group or you may have left the group incomplete earlier, and are now returning to finish. In either case, you can re-enter Submit by entering the appropriate database and typing SUBMIT. You will be prompted if you have any pending submissions that have not been processed by the database manager. If the submission has already been processed, send mail to me (EDDIEKUNS) or Paul Jerkatis (MITHELEN).

Once you are in Submit, type REVIEW. This places you at the Edit menu; the commands available in this menu are listed in Figure 1. Note that Delphi does not allow you to edit your submission until after you enter all the basic information. You can edit all features of your group from this menu. When you are finished editing your submission, type EXIT or press CTRL-Z at the EDIT> prompt. This returns you to the SUBMIT> prompt. Type EXIT or press CTRL-Z at this prompt to complete your submission.

It's more straightforward to demonstrate most of these commands than to describe them. The group I am editing is AR V1.3: FILE ARCHIVING UTILITY in the Applications (6809) database of OS9 Online. As with last month's column, all text displayed by Delphi is shown in Letter Gothic (like this), all text I entered is shown in bold (**like this**) and the comments I added are shown in Times Roman (like this).

Upload or Copy More Files	
Display Description	Title Change
Show Contents List	Download Name Change
Review Group	Delete Item
Next Group	Rearrange Items
Change All Keywords	
Group Name Change	Erase Download Names
Description Edit	
Topic Change	HELP
Keyword Change	Exit
Filetype Change	

Figure 1: Database Edit Menu

```
EDIT> display

Description of "AR V1.3: FILE ARCHIVING UTILITY":

A new version of the popular AR archiving utility. Completely compatible with previous versions. This version now stores file attributes.
```

This command simply displays the group's description, applying all formatting and dot commands. This allows you to see the description as it will be displayed normally.

```
EDIT> show
Which item (? for list): 2
  2  AR DOCUMENTATION (Size: 5732 Count: 360)

EDIT> show *
  1  AR BINARY (Size: 13312 Count: 436)
  2  AR DOCUMENTATION (Size: 5732 Count: 360)
  3  AR SOURCE (Size: 14592 Count: 189)
```

Notice that SHOW prompts you for the item number if you don't supply one. The asterisk (*) is a wildcard meaning all items. You can also type SHOW 1 to show the title, file size, and download count for Item 1.

```
EDIT> review

Name: AR V1.3: FILE ARCHIVING UTILITY
Type: PROGRAM
Date: 9-OCT-1990 22:07 by DODGECOLT

A new version of the popular AR archiving utility. Completely compatible with previous versions. This version now stores file attributes.
```

Eddie Kuns is pursuing a doctorate in physics at Rutgers University. He lives in Aurora, Illinois, and works as a programmer and researcher at Fermilab. Eddie is the OS9 Online database manager; his username is EDDIEKUNS.

```
Keywords: ARCHIVERS, DODGECOLT, AR

Contents:

   1  AR BINARY (Size: 13312 Count:
436)
   2  AR DOCUMENTATION (Size: 5732
Count: 360)
   3  AR SOURCE (Size: 14592 Count:
189)
```

REVIEW shows the group as you would see it when browsing the databases. This allows you to check the "big picture."

```
EDIT> group
Current groupname is AR V1.3: FILE
ARCHIVING UTILITY.
New Group Name:
Unchanged.
```

The GROUP NAME command allows you to modify the name of the group. Remember that a group name may consist of up to 32 characters. If you press ENTER by itself at the prompt, the name is not changed.

```
EDIT> topic app
Current topic: Utilities
```

The TOPIC command displays the topic in which this group will be moved (after spending one month in New Uploads for files in the OS-9 SIG). If you don't specify a topic on the command line, you are prompted for the topic after being shown the current topic. If you do enter the topic name on the command line, you are shown the current topic. This might be confusing because the "current topic" shown is actually the topic previously stored in the group, not the topic you entered on the command line. Please make sure you assign a topic other than New Uploads for uploads to the OS-9 SIG.

```
EDIT> filetype
Current Filetype: PROGRAM
New type:
Unchanged.
```

You may change the file type of the group using this command. The file types are the same categories listed last month and are shown in Figure 2. If you type ? at the prompt, you'll see a full list of the categories.

```
EDIT> title 2
Current Name: AR DOCUMENTATION
New Name:
Unchanged.
```

Again, if you press ENTER by itself at the prompt, the title is not changed. Please keep the title descriptive for multiple-file groups. Single-file groups do not use the title.

```
EDIT> download 3
Current Download Name: ar13.ar
New Name:
Unchanged.
```

Program or Program Pack
Newsletter
Article(s)
Transcript
Documentation
Data (Graphics, etc.)
Miscellaneous Text

Figure 2: File Types

If you didn't supply a download filename before, or want to check or change the download filename associated with a file, use this command. Press ENTER to leave the name unchanged, or enter a new download filename. Remember that Delphi allows download filenames to contain a single

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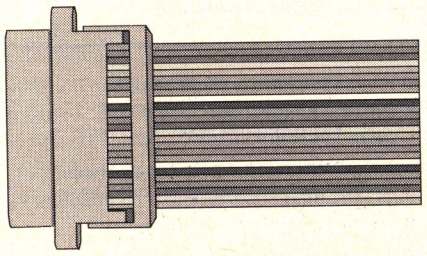
period — additional periods are changed to x if you download the file using a batch protocol.

```
EDIT> change

Enter /LIST to display the keywords
or /EDIT to change them. Control-Z
when Complete. /HELP for Help.
new keyword
/EDIT
   1       ARCHIVERS
*TYPE 1:9
   1       ARCHIVERS
   2       DODGECOLT
   3     AR
   4       new keyword
*EXIT
Exiting EDT. Saved 4 lines
```

The CHANGE ALL KEYWORDS command takes you into a mock-editor in which you can enter a list of new keywords to be appended to the original keywords. As shown above, I entered one new keyword (NEW KEYWORD) that is appended to the end of the original keywords. If you want to edit the existing keywords, type /EDIT to enter the editor. As shown when I listed lines 1 through 9, each keyword appears on a separate line. Although the last keyword is shown exactly as I entered it, the keywords are converted to uppercase after I exit the editor to the EDIT> prompt. If you are changing or adding many keywords, it may be faster to use the CHANGE ALL KEYWORDS command along with /EDIT rather than KEYWORD EDIT. Also note that when I exit EDT, I am returned to the mock editor.



```
Continue (4 lines so far). Control-
Z when complete, Control-C to quit:
/LIST
[ 4 Lines, 39 Bytes ]
ARCHIVERS
DODGECOLT
AR
new keyword
^Z

EDIT>
```

Type /LIST to see the existing keywords. Again note that the last keyword is shown exactly as I entered it. As you will see in a moment, the keywords are converted to uppercase. I was satisfied with the keywords, so I exited by pressing CTRL-Z. Typing /EXIT also works.

```
EDIT> keyword
Keyword Edit.

Enter keyword you wish to change or
delete. To add a new keyword, just
type it in. Repeat as needed, and type
CTRL/Z when complete.

KW EDIT> ?

Keyword Edit Menu:

ARCHIVERS
DODGECOLT
AR
NEW KEYWORD

KW EDIT> Which Keyword (or CTRL/Z)?
new
NEW KEYWORD
New Value:
Delete? (Y/N) yes

KW EDIT> ^Z
Save changes? (Y/N) yes
```

The KEYWORD EDIT command allows you to add, change or delete individual keywords by name. As shown here I decided to delete NEW KEYWORD, so I entered NEW at the prompt. At the next prompt I pressed ENTER and Delphi asked if I wanted to delete the keyword, to which I responded by entering YES. If you want to change a keyword, perhaps to correct a spelling error, enter the old keyword at the first prompt, then enter the new keyword at the next prompt. If you enter a keyword that is not in the list, Delphi asks if you want to add that keyword to the list.

These are the simplest commands in the edit menu. The handful of additional commands I'll leave for next month.

August Uploads

In the OS-9 General Information database, **Stephen Castello** (STEPHENC) released *Peruse*, a file viewer that uses virtual memory techniques. **Hugo Bueno** (MRGOOD) uploaded **Pete Lyall**'s *X10 Home Control* package allowing you to use an X10 Computer Interface via an RS-232 port.

In the Telcom database, **Carmen Izzi, Jr.** (CIZZIJR) and **Chris Serino** (CSERINO) contributed updates and utilities for the *AcBBS* bulletin board system. **Jay Truesdale** (JAYTRUESDALE) posted **Bruce MacKenzie**'s strchar program in Programmers Den — this program converts C source using string initializers for multi-dimensional arrays to a format compatible with the Microware C compiler.

In the CoCo 3 Graphics database in the CoCo SIG, **Joe Sannucci** (SANNUCCI) presents a fantastic 512K CoCo 3 graphics demo by **Chet Simpson**. **Michael Trammell** (LLEMMART), **Steve Ricketts** (STEVEPDX), and **Richard P. Trasborg** (TRAS) vie over who could contribute the most submissions to the database this month!

In Utilities & Applications, **M. David Johnson** (MDJOHNSON) uploaded a demo of *FORTH-83*, and **Bill Vergona** (CERCOMPBILLV) released an update of the *CoCo Tools* demo. **Clyde Johnson** (CLYDEJ) contributed a patch to *DELPHIterm 4.1* in the Telecommunications database that allows printing at 9600 and 19,200 baud. It also fixes a couple of bugs in previous versions of *DELPHIterm*. ❑

Database Report

OS-9 SIG

General Information

HISTORY OF OS-9 LEVEL2 UPGRADE	
JENG	John Eng

Applications (6809)

PERUSE - FILE VIEWER	
STEPHENC	Stephen Castello
DBG 1.0 - A LEVEL II DEBUGGER	
SAUL	Saul Bendersky
X10 HOME CONTROL	
MRGOOD	Hugo Bueno
GRAPH: GRAPHS MATH FUNCTIONS	
BFRSYS	Bernie Ruddock
DPRINT: PRINT AT X,Y ON GFX SCRE	
COLINMCKAY	Colin McKay

Telcom

ANSILIST FOR ACBBS	
CIZZIJR	Carmen Izzi Jr.
FIX MESSAGE BASE <ACBBS>	
CIZZIJR	Carmen Izzi Jr.
ACBBS RISK GAME	
CIZZIJR	Carmen Izzi Jr.
GH SERIES <ACBBS>	
CIZZIJR	Carmen Izzi Jr.
ACBBS V2.4 GAMES	
CSERINO	Chris Serino
ACBBS VERSION 2.4	
CSERINO	Chris Serino
ACBBS VERSION 2.4 INFORMATION	
CSERINO	Chris Serino

Graphics & Music

BATTLESHIP PROGRAM	
HERMAN	Chris Strickland
A LITTLE BIT OF LATIN-JAZZ.	
DMACIAS	David Macias
DESERT STORM PICTURE	
DRDUDE	Andy DePue
MAC2TANDY MACPIX DUMP AND SAMPLE	
GRAPHICSPUB	Bob Montowski

MOUNTAIN KING
OS9BERT — Bert Schneider

Programmers Den

STRCHAR.AR
JAYTRUESDALE — Jay Truesdale
TRAP ARGUMENTS OF FORKED MODULES
WUESTM — Mark Wuest

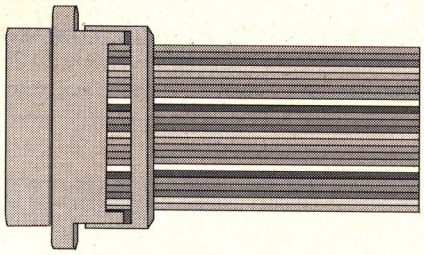
68K-OS9

OSK LHARC ARCHIVER
EMTWO — Paul M. Fitch Jr.
OSK ZOO ARCHIVER
EMTWO — Paul M. Fitch Jr.
OSK PORTS
EMTWO — Paul M. Fitch Jr.
TERMCAP ENTRIES
EDELMAR — Ed Gresick

CoCo SIG

CoCo 3 Graphics

SPINDEMO
SANNUCCI — Joe Sannucci
MAC PIX CONVERTED TO CM3
DAVIDSHAM — David Sham
UEOF2.BAS ** UPDATED **
LLEMMART — Michael Trammell
NIBTOCM3TOCLP NUDES FOR MAX-10
STEVEPDX — Steve Ricketts
READY
TRAS — Richard P. Trasborg
JESSIE ST.JAMES
TRAS — Richard P. Trasborg
NIB-TO-CM3 CONVERSIONS I
STEVEPDX — Steve Ricketts
NIB-TO-CM3 CONVERSIONS II
STEVEPDX — Steve Ricketts
NIB-TO-CM3 CONVERSIONS III
STEVEPDX — Steve Ricketts



NIB-TO-CM3 CONVERSIONS IV
STEVEPDX — Steve Ricketts
MAC TO CM3 CONVERSION
RICKMAC — Richard McNabb
TP20-GIF UEOF PATCH UTILITY
LLEMMART — Michael Trammell
TWINS-B
TRAS — Richard P. Trasborg
MTCAM2D
LLEMMART — Michael Trammell
BELTS
TRAS — Richard P. Trasborg
TENNIS01
TRAS — Richard P. Trasborg
MELANIE GRIFFITH EXPLOITATION
LLEMMART — Michael Trammell
TWINS
TRAS — Richard P. Trasborg
RASCAN 4096 MOD-TEST IMAGES
LLEMMART — Michael Trammell

Utilities & Applications

CGP115 HSCREEN2 DUMP, SHAREWARE
DAVIDSHAM — David Sham
CF83DEMO,V.1.01: FORTH-83 DEMO
MDJOHNSON — M. David Johnson
EARTH QUIZ
GAYCRAWFORD — Gay Crawford
DSXFER13.BAS
LLEMMART — Michael Trammell
WESFILES.ZIP
WESTILSON — Wesley Tilson
CF83DEMO: 1983 STD. FORTH DEMO.
MDJOHNSON — M. David Johnson
COCO TOOLS DEMO V1.1
CERCOMPBILLV — Bill Vergona

Games

CHESS KEEPER VER 1.3
DRILLMASTER — Johnny Williams
CAPELLA DEFENSE (CC1/2/3)
LLEMMART — Michael Trammell

Music & Sound

LYRA ROCK TUNES
MICHAELJN — Mike Nelson

Product Reviews & Announcement

DOCS FOR DSDISK#1-4, BY MR.DAVID
DAVIDSHAM — David Sham

Telecommunications

DELPHITERM 4.1 PATCHES
CLYDEJ — Clyde Johnson

OSk Software!

TasCOM- Vaughn Cato's popular *OSterm* comes to OSk! This robust task-oriented telecommunications program features **VT-100** and **ANSI** emulations, **autodialing** with phonebook and "learn mode" for easy parameter setupof commonly called systems, **batch file transfers, remote access mode** with multi-level password security, and **much** more! Requires MM/1, or TC-70 running K-Windows.

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Presto Partner- This OS9 favorite is now available for OSk/K-windows! This is an indispensible set of desktop accessories that will help you organize your life! As a RAM-resident utility, PP awaits you at all times. Clear off that pile of little scraps of paper around your desk, and use PP for **writing notes, doing calculations, scheduling and reminding you of events, storing and autodialing phone numbers,** and **maintaing your address book**. Requires MM/1 or TC-70 w/K-Windows.

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Artificial intelligence is just a stone's throw away

The Assembly Line
The Game of Mill

by William P. Nee

The game of Mill is several thousand years old, making it one of the earliest games played by humans. It's fitting that we should update this ancient game of skill using modern computers. The objective of the game is to remove and capture your opponent's stones until you have taken at least half of them. After reading descriptions of the game, I've made some modifications to it, adding an element of chance.

Mill involves two rows of eight boxes that are numbered sequentially from 1 to 16 as shown in Figure 1. One player controls each row. Each box is filled with three, four or five stones. The first player picks up all the stones from one of his eight boxes and puts one into each next-higher numbered box (after Box 16, continue with Box 1), until he runs out of stones. This increases the total number of stones in each of those boxes by one.

Bill Nee bucked the snowbird trend by retiring to Wisconsin from a banking career in Florida. The success of his 13-part series, "Machine Language Made BASIC" (July 1988 to July 1989), prompted him to continue writing articles about Color Computer machine-language programming. You may contact Bill at Route 2, Box 216C, Mason, WI 54856-9302, (715) 746-2952. Please include an SASE when requesting a reply.

If there are exactly two or three stones in the last box affected, and if that box is one of the opponent's boxes, the player captures the stones in that box. If this happens, he may then remove the stones from the next to last box if it, too, contains exactly two or three stones and is on the opponent's row. This continues until the player can no longer take any stones, at which point it becomes the other player's turn.

The first player to capture more than half of the original number of stones wins the game. Another way to win is to remove all of your opponent's stones in one move. If a player moves all stones to the other side and still has none on his next turn, he must pass.

The Program

I wrote *Mill* without using the graphics screens. This is in response to a number of letters I've received from people wanting games that can be played on computers with less memory — this program runs in 16K. The program also shows different ways of printing variables, messages, and registers from within machine language, another subject requested in a lot of letters.

During play, the computer controls the top row of boxes and you control the bottom. There are three skill levels. In the easiest level, the computer makes a random move about 75% of the time. At the hardest level, the computer evaluates its choice 75% of the time. You always start first.

The machine-language program shown in Listing 2 calls several macros at the beginning. While I could have written them as subroutines, these macros make the program flow easier to follow. Where necessary, the macros save values in certain registers.

The `BOARD` macro sets up the playing board and prints box numbers 16 through 9 starting at Location $0424 and box numbers 1 through 8 starting at $04A4. `CSCORE` and `HSCORE` print the computer's score and human player's score, respectively, on the board. The `UPDATE` macro prints the number of stones currently in each block.

`RANDOM` puts three, four or five stones in each block. `CRANDOM` picks a random computer move (between 8 and 15) for boxes 9 through 16. `INPUT` checks the human player's move for boxes 1 through 8, determines if there are stones in the block, and prints the move if it is legal. `DELAY` slows the updating as stones are moved. If it's too slow for you, remove lines 1400 through 1410 or use the high-speed poke. Macro `WHICH` allows you to choose the skill level.

The actual program starts at Line 1750. After you pick the skill level, the program displays the board and prompts you to make a move. When you attempt a move, the program first checks to see if you *can* move (lines 1930 through 2030). If you can move, the stones are redistributed (lines 2080 through 2150). Lines 2170 through 2240 remove any captured stones. If you've captured more than half of the original

number of stones or removed all the computer's stones, you win the game (lines 2250 through 2390).

After checking to make sure the computer can make a move (lines 2510 through 2630), the program gives the computer a turn. But, how do we make the computer think? The general solution is to evaluate all possible moves, assign a score to each move, then pick the best one. I went one level deeper than this: After studying each possible move it can make, the computer checks each possible move by the human player, assigning a score to each one. At this level, the computer must evaluate 64 (8 times 8) complete moves. (If you wanted to go two levels deeper, the computer would have to check 4096 moves! Imagine evaluating all possible moves up to the end of the game each time the computer takes a turn.)

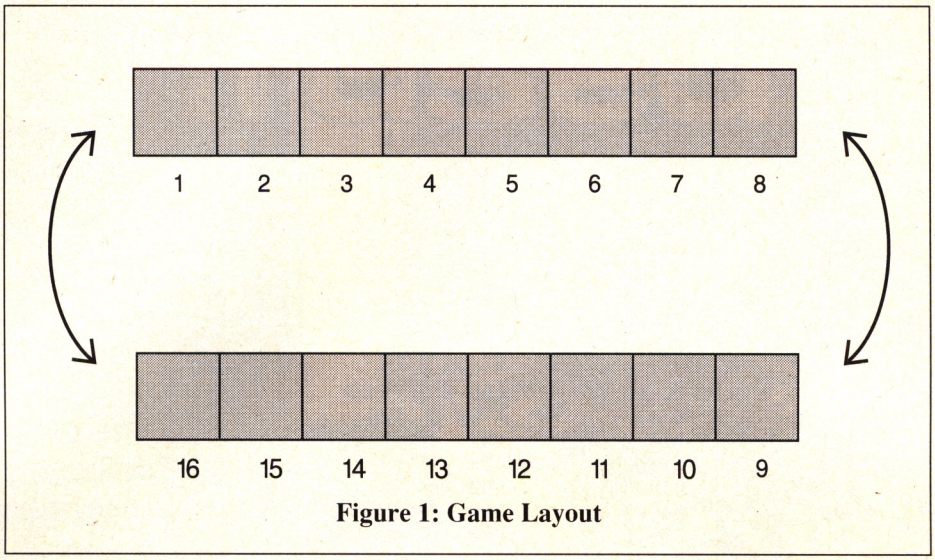


Figure 1: Game Layout

This type of reasoning requires an additional array at each level to hold the trial moves. Line 2840 starts the computer's evaluation by clearing the scores for the first box. The number of stones in each box, which is stored in ARRAYB, is now transferred to a trial array, ARRAYC (lines 2930 through 2980). The stones for the box are removed and distributed (lines 2990 through 3070). If any stones can be captured, they are added to the computer's trial score for that box (lines 3080 through 3220).

Now all the player's moves are evaluated based on the trial move the computer just made. The box information for ARRAYC, the trial array, is transferred to another trial array, ARRAYH (lines 3240 through 3340). The stones are removed from the first box, redistributed and, if possible, captured (lines 3350 through 3550). Any captured stones increase the human's trial score for the computer's original box. This continues until all eight possible moves by the human player have been checked. The program then checks the next possible computer move and evaluates all eight corresponding player moves. In this way, the computer checks all eight of its choices (lines 3560 through 3670).

When this routine ends, there are eight computer scores for each computer box (9 through 16), showing the number of stones the computer removed, and eight scores for those same boxes showing the number of stones *you* could capture for each computer move. What the computer does with this information dictates how the game will be played. We could, for example, have the program subtract the two scores for each box and pick the highest (best) one. But this could result in a win for the player if more than half the original stones were captured.

I chose a more conservative approach. The program checks to see which possible move has the lowest player score (will capture the least stones). If more than one move has this same score, the program checks to see which one would result in the highest computer score (lines 3690 through 4200). This means that even if the computer could capture several of your stones, it would move one of its stones just to avoid having it captured. Of course, each skill level uses some random moves, so some computer choices may surprise you.

After entering the program listing, check for errors by entering A/NO/NS/WE. Save the source code using W MILL.SRC, and assemble it using A MILL.BIN /NS/WE. Listing 1 is a short BASIC routine that loads the machine-language program. Enter Listing 1 and save it as MILL.BAS. Now enter RUN "MILL" and watch how the computer plays.

Some modifications you could make include changing the random factors in each skill level, evaluating the possible moves down to four levels, picking the move giving the best overall score, and converting the program for the graphics screen (perhaps using a joystick to pick your move).

Next time I'll update my very first black-and-white computer game for the CoCo, adding some color and speeding it up. Until then, if you have any questions about machine language or suggestions for future articles, please write and let me know. ❑

16K Disk

Listing 1: MILLDRV

```
1 'THE ASSEMBLY LINE
2 'WRITTEN BY WILLIAM P. NEE
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 PMODE0:PCLEAR1
20 CLEAR 200,&H3000-1
30 IF PEEK(&H3000)<>189 THEN LOA
DM"MILL":POKE&HFF40,0
40 X=RND(-TIMER)
50 EXEC &H3000:PRINT
60 PRINT"THANK'S FOR THE MEMORIE
S"
70 GOTO 70
```

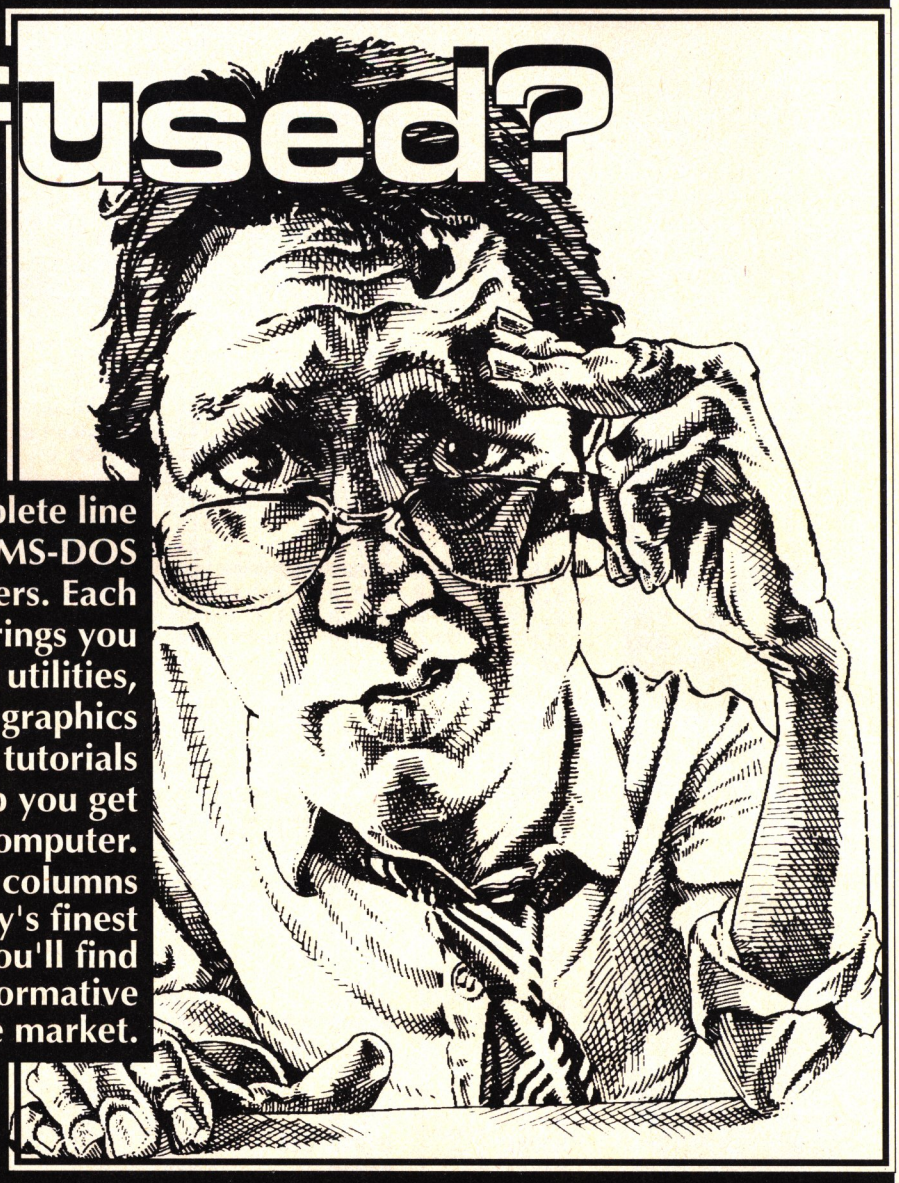
Listing 2: MILL.ASM

```
00100 BOARD   MACRO
00110         LDU     #BLOCKS
00120         LDX     #$424
00130         LDA     #8
00140 \.A     PSHS    A
00150         LDD     ,U++
00160         STD     ,X++
00170         LEAX    1,X
00180         PULS    A
00190         DECA
00200         BNE     \.A
00210         LDX     #$4A4
00220         LDA     #8
00230 \.B     PSHS    A
00240         LDD     ,U++
00250         STD     ,X++
00260         LEAX    1,X
00270         PULS    A
00280         DECA
00290         BNE     \.B
00300         ENDM
00310
00320 CSCORE  MACRO
00330         PSHS    D
00340         LDD     #$405
00350         STD     $88
00360         LDX     #MSG1
00370         JSR     $B99C
00380         LDB     TC
00390         CLRA
00400         JSR     $BDCC
00410         PULS    D
```

```
00420           ENDM
00430
00440 UPDATE    MACRO
00450           PSHS    D
00460           LDA     #16
00470           LDY     #ARRAYB
00480           LDX     #LOC
00490 \.B       PSHS    A
00500           LDU     ,X++
00510           STU     $88
00520           PSHS    X
00530           LDB     ,Y+
00540           CMPB    #9
00550           BHI     \.A
00560           LDA     #32
00570           JSR     [$A002]
00580 \.A       CLRA
00590           JSR     $BDCC
00600           PULS    X
00610           PULS    A
00620           DECA
00630           BNE     \.B
00640           PULS    D
00650           LDY     #ARRAYB
00660           ENDM
00670
00680 HSCORE    MACRO
00690           PSHS    D
00700           LDD     #$4C8
00710           STD     $88
00720           LDX     #MSG2
00730           JSR     $B99C
00740           LDB     TH
00750           CLRA
00760           JSR     $BDCC
00770           PULS    D
00780           ENDM
00790
00800 RANDOM    MACRO
00810           CLR     $6
00820           CLR     TC
00830           CLR     TH
00840           CLR     TT
00850           LDY     #ARRAYB
00860           LDA     #16
00870 \.A       PSHS    A
00880           LDB     #3
00890           JSR     $BC7C
00900           JSR     $BF1F
00910           JSR     $B3ED
00920           ADDB    #2
00930           STB     ,Y+
00940           ADDB    TT
00950           STB     TT
00960           PULS    A
00970           DECA
00980           BNE     \.A
00990           LSR     TT
01000           INC     TT
01010           ENDM
01020
01030 CRAND     MACRO
01040           CLR     $6
01050           LDY     #ARRAYB
01060 \.A       LDB     #8
01070           JSR     $BC7C
01080           JSR     $BF1F
01090           JSR     $B3ED
01100           ADDB    #7
01110           TST     B,Y
01120           BEQ     \.A
01130           PSHS    B
01140           INCB
01150           ENDM
01160
01170 INPUT     MACRO
01180           LDY     #ARRAYB
01190 \.A       JSR     [$A000]
01200           CMPA    #'1
01210           BLO     \.A
01220           CMPA    #'8
01230           BHI     \.A
01240           SUBA    #'1
01250           TST     A,Y
01260           BEQ     \.A
01270           ADDA    #'1
01280           JSR     [$A002]
01290           SUBA    #'1
01300           LDB     A,Y
01310           STB     V
01320           CLR     A,Y
01330           ENDM
01340
01350
01360 DELAY     MACRO
01370           LDX     #0
01380 \.A       LEAX    -1,X
01390           BNE     \.A
01400 \.B       LEAX    -1,X
01410           BNE     \.B
01420           ENDM
01430
01440 WHICH     MACRO
01450           LDD     #$42A
01460           STD     $88
01470           LDX     #TITLE
01480           JSR     $B99C
01490           LDD     #$445
01500           STD     $88
01510           LDX     #WHICH0
01520           JSR     $B99C
01530           LDD     #$467
01540           STD     $88
01550           LDX     #WHICH1
01560           JSR     $B99C
01570           LDD     #$48A
01580           STD     $88
01590           LDX     #WHICH2
01600           JSR     $B99C
01610           LDD     #$4AD
01620           STD     $88
01630           LDX     #WHICH3
01640           JSR     $B99C
01650 \.A       JSR     [$A000]
01660           CMPA    #'1
01670           BLO     \.A
01680           CMPA    #'3
01690           BHI     \.A
01700           SUBA    #$30
01710           STA     GAME
01720           ENDM
01730
01740           ORG     $3000
01750 START     JSR     $A928
01760           WHICH
01770           RANDOM
01780           JSR     $A928
01790           BOARD
01800           CSCORE
01810           UPDATE
01820           HSCORE
01830 HMOVE     LDX     #$500
01840           LDA     #96
01850           LDB     #60
01860 HCLEAR    STA     ,X+
01870           DECB
01880           BNE     HCLEAR
01890           LDD     #$500
01900           STD     $88
01910           LDX     #MSG3
01920           JSR     $B99C
01930           LDY     #ARRAYB
01940           LDA     #7
01950 HM1       TST     A,Y
01960           BNE     HPICK
01970           DECA
01980           BPL     HM1
01990           LDD     #$524
02000           STD     $88
02010           LDX     #MSG8
02020           JSR     $B99C
02030           LBRA    CMOVE
02040
02050 HPICK     INPUT
02060           UPDATE
02070           DELAY
02080 HP1       LDY     #ARRAYB
02090           INCA
02100           ANDA    #15
02110           INC     A,Y
02120           UPDATE
02130           DELAY
02140           DEC     V
02150           LBNE    HP1
02160
02170 HTAKE     CMPA    #8
02180           LBLO    CMOVE
02190           LDB     A,Y
02200           CMPB    #1
02210           LBEQ    CMOVE
02220           CMPB    #3
02230           LBHI    CMOVE
02240           CLR     A,Y
02250           ADDB    TH
02260           STB     TH
02270           UPDATE
02280           HSCORE
02290           DELAY
02300           CMPB    TT
02310           LBHS    HWIN
02320           DECA
02330 ALLZ      LDB     #15
02340 AZ1       TST     B,Y
02350           LBNE    HTAKE
02360           DECB
02370           CMPB    #7
02380           BHI     AZ1
02390           LBRA    HWIN
02400
02410 CMOVE     LDX     #$540
02420           LDA     #96
02430           LDB     #96
02440 CCLEAR    STA     ,X+
02450           DECB
02460           BNE     CCLEAR
02470           LDD     #$540
02480           STD     $88
02490           LDX     #MSG4
02500           JSR     $B99C
02510           LDY     #ARRAYB
02520           LDA     #15
02530           LDB     #8
02540 CM1       TST     A,Y
02550           BNE     CGAME
02560           DECA
02570           DECB
02580           BNE     CM1
02590           LDD     #$564
02600           STD     $88
02610           LDX     #MSG8
02620           JSR     $B99C
02630           LBRA    HMOVE
02640
02650 CGAME     LDB     #100
02660           CLR     $6
02670           JSR     $BC7C
02680           JSR     $BF1F
02690           JSR     $B3ED
02700           LDA     GAME
02710           CMPA    #3
02720           BEQ     HARD
```

Confused?

Let us help.



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```
02730          CMPA    #2
02740          BEQ     MEDIUM
02750 EASY     CMPB    #25
02760          LBHS    NEWR
02770          BRA     CPICK
02780 MEDIUM   CMPB    #50
02790          LBHS    NEWR
02800          BRA     CPICK
02810 HARD     CMPB    #75
02820          LBHS    NEWR
02830
02840 CPICK    LDY     #ARRAYB
02850          LDA     #8
02860 CL8      STA     C
02870          LDX     #SC
02880          LDU     #SH
02890          CLR     A,X
02900          CLR     A,U
02910          TST     A,Y
02920          LBEQ    CDONE
02930          LDU     #ARRAYC
02940          LDB     #15
02950 CL1      LDA     B,Y
02960          STA     B,U
02970          DECB
02980          BPL     CL1
02990          LDA     C
03000          LDB     A,U
03010          CLR     A,U
03020          STB     V
03030 CL2      INCA
03040          ANDA    #15
03050          INC     A,U
03060          DEC     V
03070          BNE     CL2
03080          CMPA    #7
03090          BHI     HUMAN
03100 CL3      STA     XC
03110          LDB     A,U
03120          CMPB    #1
03130          BEQ     HUMAN
03140          CMPB    #3
03150          BHI     HUMAN
03160          LDA     C
03170          LDX     #SC
03180          ADDB    A,X
03190          STB     A,X
03200          LDA     XC
03210          DECA
03220          BPL     CL3
03230
03240 HUMAN    CLRA
03250 CL7      STA     H
03260          LDU     #ARRAYC
03270          TST     A,U
03280          BEQ     HDONE
03290          LDX     #ARRAYH
03300          LDB     #15
03310 CL4      LDA     B,U
03320          STA     B,X
03330          DECB
03340          BPL     CL4
03350          LDA     H
03360          LDB     A,X
03370          CLR     A,X
03380          STB     V
03390 CL5      INCA
03400          ANDA    #15
03410          INC     A,X
03420          DEC     V
03430          BNE     CL5
03440          CMPA    #8
03450          BLO     HDONE
03460 CL6      STA     XH
03470          LDB     A,X
03480          CMPB    #1
03490          BEQ     HDONE
03500          CMPB    #3
03510          BHI     HDONE
03520          LDA     C
03530          LDU     #SH
03540          ADDB    A,U
03550          STB     A,U
03560          LDA     XH
03570          DECA
03580          CMPA    #7
03590          BHI     CL6
03600 HDONE    LDA     H
03610          INCA
03620          CMPA    #7
03630          BLS     CL7
03640 CDONE    LDA     C
03650          INCA
03660          CMPA    #15
03670          LBLS    CL8
03680
03690 CEVAL    LDB     #8
03700          LDX     #SC
03710          LDU     #SH
03720 CE1      TST     B,X
03730          BNE     CE2
03740          TST     B,U
03750          BNE     CE2
03760          INCB
03770          CMPB    #15
03780          BLS     CE1
03790          BRA     NEWR
03800 CE2      LDB     #8
03810          LDY     #ARRAYB
03820 CE3      TST     B,Y
03830          BNE     CE4
03840          INCB
03850          BRA     CE3
03860 CE4      LDA     B,X
03870          STA     C
03880          LDA     B,U
03890          STA     H
03900          STB     MOVE
03910 CE4A     TST     B,Y
03920          BEQ     CE5
03930          LDA     B,U
03940          CMPA    H
03950          BHS     CE5
03960          STA     H
03970          LDA     B,X
03980          STA     C
03990          STB     MOVE
04000 CE5      INCB
04010          CMPB    #15
04020          BLS     CE4A
04030          LDB     #8
04040 CE6      LDA     B,U
04050          CMPA    H
04060          BNE     CE7
04070          LDA     B,X
04080          CMPA    C
04090          BLS     CE7
04100          STA     C
04110          STB     MOVE
04120 CE7      INCB
04130          CMPB    #15
04140          BLS     CE6
04150          LDB     MOVE
04160          TST     B,Y
04170          BEQ     NEWR
04180          PSHS    B
04190          INCB
04200          BRA     CTAKE
04210
04220 NEWR     CRAND
04230
04240 CTAKE    LDY     #ARRAYB
04250          CLRA
04260          JSR     $BDCC
04270          DELAY
04280          PULS    A
04290          LDB     A,Y
04300          CLR     A,Y
04310          STB     V
04320          UPDATE
04330          DELAY
04340 CT1      INCA
04350          ANDA    #15
04360          INC     A,Y
04370          UPDATE
04380          DELAY
04390          DEC     V
04400          LBNE    CT1
04410          CMPA    #7
04420          LBHI    HMOVE
04430 CT2      TSTA
04440          LBMI    HMOVE
04450          LDB     A,Y
04460          CMPB    #1
04470          LBEQ    HMOVE
04480          CMPB    #3
04490          LBHI    HMOVE
04500          CLR     A,Y
04510          ADDB    TC
04520          STB     TC
04530          UPDATE
04540          CSCORE
04550          DELAY
04560          CMPB    TT
04570          BHS     CWIN
04580          DECA
04590          LDB     #7
04600 CT3      TST     B,Y
04610          LBNE    CT2
04620          DECB
04630          BPL     CT3
04640          BRA     CWIN
04650
04660 HWIN     LDD     #$524
04670          STD     $88
04680          LDX     #MSG6
04690          JSR     $B99C
04700          LDD     #$540
04710          BRA     CW1
04720
04730 CWIN     LDD     #$564
04740          STD     $88
04750          LDX     #MSG7
04760          JSR     $B99C
04770          LDD     #$580
04780 CW1      STD     $88
04790          LDX     #MSG9
04800          JSR     $B99C
04810 CW2      JSR     [$A000]
04820          BEQ     CW2
04830          CMPA    #'N
04840          LBNE    START
04850          RTS
04860
04870 BLOCKS   FDB     $3136
04880          FDB     $3135
04890          FDB     $3134
04900          FDB     $3133
04910          FDB     $3132
04920          FDB     $3131
04930          FDB     $3130
04940          FDB     $8039
04950          FDB     $8031
04960          FDB     $8032
04970          FDB     $8033
04980          FDB     $8034
04990          FDB     $8035
05000          FDB     $8036
```

```
05010           FDB     $8037
05020           FDB     $8038
05030 ARRAYB    RMB     16
05040 ARRAYC    RMB     16
05050 ARRAYH    RMB     16
05060 SC        RMB     16
05070 SH        RMB     16
05080 TC        RMB     1
05090 TH        RMB     1
05100 TT        RMB     1
05110 V         RMB     1
05120 C         RMB     1
05130 H         RMB     1
05140 XC        RMB     1
05150 XH        RMB     1
05160 MOVE      RMB     1
05170 GAME      RMB     1
05180 MSG1      FCC     / COMPUTER
'S SCORE - /
05190           FCB     0
05200 MSG2      FCC     / YOUR SCO
RE - /
05210           FCB     0
05220 MSG3      FCC     / YOUR MOV
E - /
05230           FCB     0
05240 MSG4      FCC     / MY MOVE
/
05250           FCB     0
05260 MSG5      FCC     / THINKING
 /
05270           FCB     0
05280 MSG6      FCC     / YOU WIN!
! /
05290           FCB     0
05300 MSG7      FCC     / I WIN!!
/
05310           FCB     0
05320 MSG8      FCC     / NO MOVE
/
05330           FCB     0
05340 MSG9      FCC     ? PLAY ANO
THER GAME <Y/N> ?
05350           FCB     0
05360 TITLE     FCC     / GAME OF
MILL/
05370           FCB     0
05380 WHICH0    FCC     / DO YOU W
ANT TO PLAY -/
05390           FCB     0
05400 WHICH1    FCC     / 1> EASY/
05410           FCB     0
05420 WHICH2    FCC     / 2> MEDIU
M/
05430           FCB     0
05440 WHICH3    FCC     / 3> HARD/
05450           FCB     0
05460
05470 LOC       FDB     $484
05480           FDB     $487
05490           FDB     $48A
05500           FDB     $48D
05510           FDB     $490
05520           FDB     $493
05530           FDB     $496
05540           FDB     $499
05550           FDB     $459
05560           FDB     $456
05570           FDB     $453
05580           FDB     $450
05590           FDB     $44D
05600           FDB     $44A
05610           FDB     $447
05620           FDB     $444
05630           END     START
```


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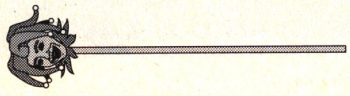
Manipulate disk files with ease

Directory Helper



by Kathy Rumpel

Disk drives provide an excellent way to store lots of data quickly. However, as anyone who uses them knows, it takes only a few weeks to end up with a bunch of cluttered disks. This is true regardless of the operating system you may be using.

Clearly the solution is to be careful and organize your files on disk so you know where they are. I wrote *Direct Help* to aid this process. This utility for the CoCo 3 allows you to manipulate files with ease. It gives you the ability to see a wide directory and to use wildcards for directories, copying and deleting.

Program Operation

When you run *Direct Help*, the Main menu appears, showing you icons for the different options. Use the up and down arrow keys to move the "mouse" cursor to the icon for the option you want, then press ENTER.

The first option on the menu is Wide Directory. With this option you can print a directory listing of the disk in Drive 0 on the screen or printer. The filenames are printed three across, and the number of free granules is given at the end of the listing.

If you tell the program to send the listing to the printer, you get a chance to name the directory. This can help you identify which hardcopy goes with which disk. Initially, *Direct Help* is set for a printer speed of 2400 baud. If your printer requires a different speed, adjust Line 52 accordingly.

The second menu option is Wild List. This option gives you the ability to list files according to the beginning characters of the filename or the filename extension.

Wild Copy, the third option, allows you to copy files from one disk to another, using the same wildcard setup described for Wild List. As each file is copied, its name is displayed onscreen. If no matching filenames are found, no files are copied. As written, the program is designed to use only Drive 0, making it useful for people with only one disk drive. If you have a two drive system, change lines 111 and 113 as follows:

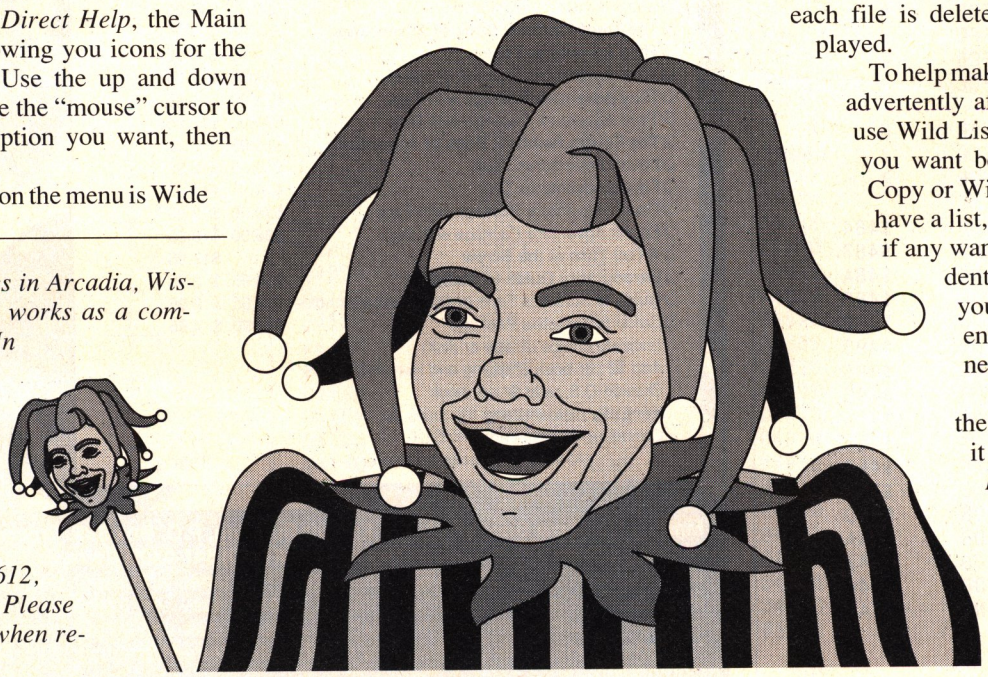
```
111 F1$=N$(N)+"."+E$(N)+":0":F2$
=N$(N)+"."+E$(N)+":1":COPY F1$ T
O F2$
113 REM DELETE
```

Wild Delete also works with wildcards, allowing you to delete unnecessary files or files you have copied to other disks. As each file is deleted, its name is displayed.

To help make sure no files are inadvertently affected, it is wise to use Wild List with the wildcards you want before you use Wild Copy or Wild Delete. Once you have a list, you'll be able to tell if any wanted files might accidentally be deleted. Then you can choose a different wildcard scheme if necessary.

The final option on the menu is Exit. When it is selected, *Direct Help* returns you to BASIC.

I hope you find *Direct Help* useful when organizing your disk files. ❑



Kathy Rumpel lives in Arcadia, Wisconsin, where she works as a computer operator. In addition to programming, she enjoys sports and drumming. Kathy can be contacted at Route 1, Box 67-A, Arcadia, WI 54612, (608) 323-7046. Please include an SASE when requesting a reply.

The Listing: DIRECT

```
1 'DIRECT HELP
2 'WRITTEN BY KATHY RUMPEL
3 'COPYRIGHT (C) JANUARY 1992
4 'BY FALSOFT, INC
5 'RAINBOW MAGAZINE
6 RGB:PALETTE0,57:PALETTE2,8:POK
E &HFF9A,57:POKE 65497,0
7 HSCREEN2:POKE &HFF9A,57:HCOLOR
2,0
8 CLEAR1500:Q=0:Z=0:FI=0:S1$=STR
ING$(10," "):S2$=STRING$(9," "):
X1=75:Y1=7:X2=110:Y2=42
9 HLINE(X1,Y1)-(X2,Y2),PSET,B
10 HLINE(X1,Y1+37)-(X2,Y2+35),PS
ET,B
11 HLINE(X1,Y1+72)-(X2,Y2+70),PS
ET,B
12 HLINE(X1,Y1+107)-(X2,Y2+105),
PSET,B
13 HLINE(X1,Y1+142)-(X2,Y2+140),
PSET,B
14 HPRINT(18,0),"** DIRect HELP
**":HPRINT(19,23),"BY: Kathy Rum
pel"
15 HDRAW"BM80,10;C8S8BD4D8R12U8L
12BD2BRR3BRR3BRR2BD2L2BLL3BLL3BD
2R3BRR3BRR2":HPRINT(20,4),"WIDE
DIRECTORY"
16 HDRAW"BM80,45;C8S8BD2BRGDFREU
HLR8FD2L8D5BDBRR7U7BD7DGL7EUHLGD
FRBR2BU3R4BUL4BUR4BUL4BUR4BUL4":
HPRINT(20,8),"WILD LIST"
17 HDRAW"BM80,80;C8S8BD4D9R4U9L4
BR8D9R4U9L4":HPRINT(20,12),"WILD
 COPY"
18 HDRAW"BM80,115;C8S8BD2DRDRDRD
RDRD2LGD2FR2EU2HLBU2R4GD2FR2EU2H
L2BL3ULULULULULU":HPRINT(20,16),
"WILD DELETE"
19 HDRAW"BM80,150;C8S8BD3BR2D10B
R8U4BLS4LDLULURURDRDBR2S8U6L8":H
PRINT(20,20),"EXIT"
20 CURSOR$="S4H4L2D4L8G4L4G3NL5B
E3BR4F4R8D4R2E6U4H2"
21 H=55:V=20
22 HDRAW"BM=H;,=V;C2"+CURSOR$:HP
AINT(55,V+5),2,2
23 I$=INKEY$:IF I$="" THEN 23
24 IF I$=CHR$(10) THEN HDRAW"BM=
H;,=V;C0"+CURSOR$:HPAINT(55,V+5)
,0,0:V=V+35
25 IF I$=CHR$(94) THEN HDRAW"BM=
H;,=V;C0"+CURSOR$:HPAINT(55,V+5)
,0,0:V=V-35
26 IF I$=CHR$(13) THEN GOTO 30
27 IF V>160 THEN V=160
28 IF V<20 THEN V=20
29 GOTO22
30 POKE65496,0:WIDTH80:PALETTE0,
63:PALETTE8,0:CLS1
31 IF V=20 THEN PICK=1
32 IF V=55 THEN PICK=2
33 IF V=90 THEN PICK=3
```


MLBASIC 2.0 - BASIC Compiler

If you want your BASIC programs to run up to 50 times faster, or want more programming features without learning another language, MLBASIC is for you.

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```
34 IF V=125 THEN PICK=4
35 IF V=160 THEN PICK=5
36 ON PICK GOTO 37,62,86,116,143
37 'WIDE DIRECTORY
38 ON ERR GOTO 5:ON BRK GOTO 5:C
LS:LOCATE30,5:PRINT"**WIDE DIREC
TORY**":LOCATE23,8:PRINT"1> SCRE
EN  (or)  2> PRINTER? ";
39 A$=INKEY$:IFA$=""THEN 39
40 IF A$<"1" OR A$>"2" THEN 39
41 ON VAL(A$) GOSUB 43,51
42 PRINT:PRINT TAB(25);"Press an
y key to return...";:EXEC44539:C
LS:GOTO5
43 'SCREEN
44 CLS:PRINT TAB(29);"  Director
y":PRINT
45 FOR X=3 TO 11:GOSUB 145
46 FOR N=0TO7:IFLEFT$(N$(N),1)<>
CHR$(0) AND LEFT$(N$(N),1)<>CHR$
(255) THEN GOSUB 48
47 NEXT N:NEXT X:PRINT:PRINT:PRI
NTQ;" File(s)";:PRINT"  ";FREE(0
);" granules free":Q=0:RETURN
48 Q=Q+1:Z=Z+1
49 PRINT"  ";N$(N);"/ ";E$(N);"
 ";:IF Z=3 THEN PRINTS2$;:Z=0:RE
TURN
50 PRINTS1$;:RETURN
51 'PRINTER
52 POKE 150,18:'2400 BAUD
53 CLS:PRINT"DIRECTORY NAME: ";:
LINEINPUT DN$
54 CLS:PRINT"Directory sent to p
rinter..."
55 PRINT#-2:PRINT#-2,TAB(15);"
Directory: ";DN$:PRINT#-2
56 FOR X=3TO11:GOSUB 145
57 FOR N=0TO7:IF LEFT$(N$(N),1)<
>CHR$(0) AND LEFT$(N$(N),1)<>CHR
$(255) THEN GOSUB 59
58 NEXT N:NEXT X:PRINT#-2:PRINT#
-2:PRINT#-2,Q;" File(s)";:PRINT#
-2,"  ";FREE(0);" granules free"
:Q=0:RETURN
59 Q=Q+1:Z=Z+1
60 PRINT#-2,"  ";N$(N);"/ ";E$(N
);"  ";:IF Z=3 THEN PRINT#-2,S2$
;:Z=0:RETURN
61 PRINT#-2,S1$;:RETURN
62 'WILD LIST
63 ON BRK GOTO 64:ON ERR GOTO 64
64 CLS:LOCATE30,5:PRINT"**WILD L
IST**":LOCATE30,8:PRINT"1> BEGIN
NING":LOCATE30,9:PRINT"2> EXTENS
ION":LOCATE30,10:PRINT"3> MENU":
LOCATE30,12:PRINT"SELECTION? ";
65 A$=INKEY$:IFA$="" THEN 65
66 IF A$<"1" OR A$>"3" THEN 65
67 ON VAL(A$) GOSUB 69,77,85
68 GOTO 64
69 'BEGINNING
70 CLS:LOCATE9,5:PRINT"List all
files that begin with a certain
letter or letters.":LOCATE20,10:
PRINT"ENTER BEGINNING LETTER(S):
 ";:LINEINPUTX$:LE=LEN(X$):CLS
71 IF X$="" THEN GOTO 64
72 FOR X=3TO11:GOSUB145
73 FOR N=0TO7:IF LEFT$(N$(N),LE)
=X$ AND LEFT$(N$(N),1)<>CHR$(0)
THEN PRINT TAB(30); N$(N);"  ";E
$(N):Q=Q+1:FI=FI+1
74 IF FI=20 THEN PRINT:PRINT TAB
(25);"Strike a key to continue..
.":EXEC44539:PRINT:FI=0
75 NEXTN:NEXTX:PRINT:PRINT TAB(3
0);Q;" File(s)":Q=0:FI=0
76 PRINT:PRINT TAB(25);"Press an
y key to return...";:EXEC44539:R
ETURN
77 'EXTENSION
78 CLS:LOCATE18,5:PRINT"List all
 files with a certain extension"
:LOCATE25,10:PRINT"ENTER EXTENSI
ON: ";:LINEINPUTX$:LE=LEN(X$):CL
S
79 IF X$="" THEN GOTO 64
80 FOR X=3TO11:GOSUB145
81 FOR N=0TO7:IFLEFT$(E$(N),LE)=
X$ AND LEFT$(N$(N),1)<>CHR$(0) T
HEN PRINT TAB(30);N$(N);"  ";E$(
N):Q=Q+1:FI=FI+1
82 IF FI=20 THEN PRINT:PRINT TAB
(25);"Strike a key to continue..
.":EXEC44539:PRINT:FI=0
83 NEXTN:NEXTX:PRINT:PRINT TAB(3
0);Q;" File(s)":Q=0:FI=0
84 PRINT:PRINT TAB(25);"Press an
y key to return...";:EXEC44539:R
ETURN
85 CLS:GOTO5
86 'WILD COPY
87 ON BRK GOTO 88:ON ERR GOTO 88
88 CLS:LOCATE30,5:PRINT"**WILD C
OPY**":LOCATE30,8:PRINT"1> BEGIN
NING":LOCATE30,9:PRINT"2> EXTENS
ION":LOCATE30,10:PRINT"3> MENU":
LOCATE30,12:PRINT"SELECTION? ";
89 A$=INKEY$:IFA$="" THEN 89
90 IF A$<"1" OR A$>"3" THEN 89
91 ON VAL(A$) GOSUB 93,101,109
92 GOTO 88
93 'BEGINNING
94 CLS:LOCATE9,5:PRINT"Copy all
files that begin with a certain
letter or letters.":LOCATE20,10:
PRINT"ENTER BEGINNING LETTER(S):
 ";:LINEINPUTX$:LE=LEN(X$):CLS
95 IF X$="" THEN GOTO 88
96 SOUND10,5:PRINT:PRINT"INSERT
SOURCE DISK AND PRESS ANY KEY TO
 BEGIN...":PRINT:EXEC44539
97 FOR X=3TO11:GOSUB145
98 FOR N=0TO7:IF LEFT$(N$(N),LE)
=X$ AND LEFT$(N$(N),1)<>CHR$(0)
THEN GOSUB110
99 NEXTN:NEXTX:PRINT:PRINT TAB(3
0);Q;" File(s) copied":Q=0
100 PRINT:PRINT TAB(25);"Press a
ny key to return...";:EXEC44539:
RETURN
101 'EXTENSION
102 CLS:LOCATE18,5:PRINT"Copy al
l files with a certain extension
":LOCATE25,10:PRINT"ENTER EXTENS
ION: ";:LINEINPUTX$:LE=LEN(X$):C
LS
103 IF X$="" THEN GOTO 88
104 SOUND10,5:PRINT:PRINT"INSERT
 SOURCE DISK AND PRESS ANY KEY T
O BEGIN...":PRINT:EXEC44539
105 FOR X=3TO11:GOSUB145
106 FOR N=0TO7:IFLEFT$(E$(N),LE)
=X$ AND LEFT$(N$(N),1)<>CHR$(0)
THEN GOSUB110
107 NEXTN:NEXTX:PRINT:PRINT TAB(
30);Q;" File(s) copied":Q=0
108 PRINT:PRINT TAB(25);"Press a
ny key to return...";:EXEC44539:
RETURN
109 CLS:GOTO5
110 'COPY
111 F$=N$(N)+"."+E$(N):COPY F$
112 PRINT:PRINT:PRINT TAB(30);N$
(N);".";E$(N);" copied"
113 SOUND10,5:PRINT:PRINT"INSERT
 SOURCE DISK AND PRESS ANY KEY T
O CONTINUE...":PRINT:EXEC44539
114 Q=Q+1
115 RETURN
116 'WILD DEL
117 ON BRK GOTO 118:ON ERR GOTO
118
118 CLS:LOCATE30,5:PRINT"**WILD
DELETE**":LOCATE30,8:PRINT"1> BE
GINNING":LOCATE30,9:PRINT"2> EXT
ENSION":LOCATE30,10:PRINT"3> MEN
U":LOCATE30,12:PRINT"SELECTION?
";
119 A$=INKEY$:IFA$="" THEN 119
120 IF A$<"1" OR A$>"3" THEN 119
121 ON VAL(A$) GOSUB 123,130,137
122 GOTO 118
123 'BEGINNING
124 CLS:LOCATE9,5:PRINT"Delete a
ll files that begin with a certa
in letter or letters.":LOCATE20,
10:PRINT"ENTER BEGINNING LETTER(
S): ";:LINEINPUTX$:LE=LEN(X$):CL
S
125 IF X$="" THEN GOTO 118
126 FOR X=3TO11:GOSUB145
127 FOR N=0TO7:IF LEFT$(N$(N),LE
)=X$ AND LEFT$(N$(N),1)<>CHR$(0)
 THEN GOSUB138
128 NEXTN:NEXTX:PRINT:PRINT TAB(
30);Q;" File(s) deleted":Q=0
129 PRINT:PRINT TAB(25);"Press a
ny key to return...";:EXEC44539:
RETURN
130 'EXTENSION
131 CLS:LOCATE18,5:PRINT"Delete
all files with a certain extensi
on":LOCATE25,10:PRINT"ENTER EXTE
NSION: ";:LINEINPUTX$:LE=LEN(X$)
:CLS
132 IF X$="" THEN GOTO 118
133 FOR X=3TO11:GOSUB145
134 FOR N=0TO7:IFLEFT$(E$(N),LE)
=X$ AND LEFT$(N$(N),1)<>CHR$(0)
THEN GOSUB138
135 NEXTN:NEXTX:PRINT:PRINT TAB(
30);Q;" File(s) deleted":Q=0
136 PRINT:PRINT TAB(25);"Press a
ny key to return...";:EXEC44539:
RETURN
137 CLS:GOTO5
138 'DELETE
139 PRINT TAB(30);N$(N);".";E$(N
);" deleted"
140 KILL N$(N)+"."+E$(N)
141 Q=Q+1
142 RETURN
143 'EXIT
144 WIDTH32:END
145 DSKI$ 0,17,X,A$,B$:C$=A$+LEF
T$(B$,127):N$(0)=LEFT$(C$,8):E$(
0)=MID$(C$,9,3)
146 FOR N=1TO7:N$(N)=MID$(C$,N*3
2+1,8):E$(N)=MID$(C$,9+N*32,3):N
EXT N
147 RETURN
```

Bright Idea: Order some of these CoCo programs today!

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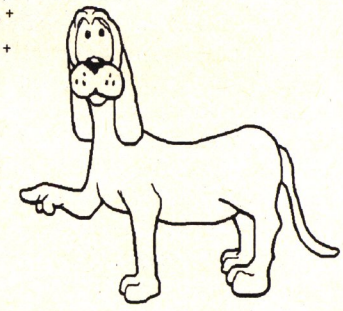

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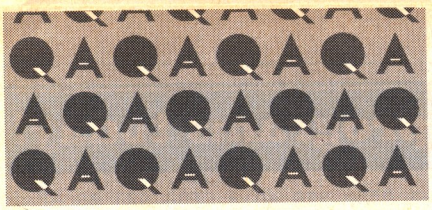


Installing a Disk Drive

by Marty Goodman
Contributing Editor

Q *Where can I get Amphenol power connectors for 5¼-inch drives? Also, when adding a drive to my FD-501, the 34-pin connectors are spaced too closely together for me to connect a second drive of a different brand. Any suggestions?*

Bob Post (BIGB)
Batavia, New York

A Radio Shack now sells power connectors (Catalog No. 278-767) for 5¼-inch disk drives. The price is rather steep ($2.49), but if you don't live near an electronics parts or surplus house, at least the power connector is available. Radio Shack also sells spare IDC (crimp-on) 34-pin female edge connectors (Catalog No. 276-1564). You can purchase one of these and crimp it onto the 34-conductor ribbon cable at a spot that allows you to connect the second drive. Be sure you remove the terminator resistor from that second drive.

Switching vs. Linear Power Supplies

Q *I was told by a Radio Shack employee that the power supply in the CoCo 3 uses a switching regulator. Is this true? What are the advantages of switching power supplies versus linear power supplies? What suggestions can you give me regarding connecting a PC power supply to the CoCo?*

Lucas B. Korytkowski
Scarborough, Ontario
Canada

A No model of Color Computer ever used a switching power supply. All CoCo power supplies from the first CoCo 1 through the CoCo 3 are relatively simple linear power supplies. The CoCo 1 used an LM723 (generic) voltage regulator, and the CoCo 2 and CoCo 3 use Tandy's custom SALT chip to generate a regulated source of 5 volts and control a power transistor at that voltage. The power supply in the CoCo could have been made somewhat more simple by employing a single 7805 monolithic voltage regulator, but Tandy's engineers apparently chose to do things in a slightly (and needlessly) more convoluted fashion.

Switching power supplies have the advantages of being physically smaller and lighter than a linear power supply of corresponding power capacity. They are also considerably less expensive to produce in large quantities. They enjoy this advantage because they operate at rather high frequencies, where much smaller transformers can be employed for the same power capacities. Switching power supplies are vastly more difficult to repair than corresponding linear power supplies, partly because they employ up to 10 times as many components but mainly because they operate using feedback circuits, which makes it much more difficult to trace a problem to faulty components. Switching power supplies are more difficult to design, too.

A linear power supply is a good choice for one-of-a-kind and other small production runs. They tend to be heavy, bulky, simple and rugged. Frankly, I am glad Tandy chose to use a relatively simple linear power supply in the CoCo and Multi-Pak.

Last month in this column I went into some detail on connecting a PC-compatible power supply to a CoCo 3. The principle of the procedure is to provide regulated 5 volts to the main Color Computer and feed +12 and -12 volts from the PC power supply to pins 15 and 16 of the SALT chip. Various other details need to be attended to, of course, and I covered those last month.

Memory Upgrades

Q *How can I upgrade an older 4K CoCo 1 to 64K?*

E. Schulman (ESCHULMAN)
Oak Ridge, Tennessee

A All 4K CoCo 1's I've ever seen use either revision B, C, or D motherboards. Revision B and C motherboards pretty much cannot be upgraded at all. Revision D motherboards can, in theory, be upgraded (I still use an upgraded CoCo with a revision D motherboard for some projects) but the upgrade is very tedious. The upgrade involves taking the machine completely apart, removing the ground sheet, cutting and jumpering several traces, and running several jumpers. Further, you have to buy a set of eight 64K DRAM chips for the upgrade. With 64K Extended BASIC CoCo 2's selling for as little as $20 at gararge sales and swap meets, it seems foolish to embark on an upgrade of a Revision D motherboard. Thus, I would not recommend the attempt.

Adding Disk Drives

Q *Can I use three drives with the power supply in my FD-501 case? Can I use a 40-track double-sided drive as a 35-track*

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

single-sided drive on occasion for compatibility with Disk BASIC?

Chris Deierlein (CDEIERLEIN)
Peekskill, New York

Most likely you will not be able to use three drives with the power supply in the FD-501 case. Of course, different drives require different amounts of power, but it is my understanding that the FD-501 power supply has barely enough power for two drives. Adding a third drive will almost certainly overload the power supply.

Yes, you can use any 40-track single- or double-sided drive as a 35-track drive. No hardware modification is needed. Merely running software that treats the drive as a 35-track single-sided drive makes it behave like one.

Erasing EPROMs

Can you suggest some guidelines for erasing EPROMs?

John Burke (JBURKE)
Fremont, California

To calibrate an EPROM eraser, program several of the same make, model and brand of EPROM you plan to use with all zeros. Now put them in your eraser, turn on the UV light for 15 seconds, then remove and check the EPROMs to see if they are all erased (set to all ones). If not, put them back for another 15 seconds of UV, and repeat the process. Eventually, you will determine the *minimum time to apparent erasure*. If this time is less than one minute, readjust your EPROM eraser so the chips are farther from the bulb. Otherwise the EPROMs may be damaged. Once you have the time required to erase the EPROMs greater than one minute, use three to five times the minimum time to apparent erasure as your exposure when erasing EPROMs. Note that ancient chips such as the Motorola 68766 may take considerably more time than others to be erased, and the most modern chips with ultra small cells may take considerably less time to be erased than their predecessors. It is wise to calibrate your eraser for various different types of EPROMs.

VT100 Emulation

Can I get VT100 emulation in a CoCo 3 terminal program? Can I find support for Kermit?

John W. Handis (MRINTENSITY)
Pittsburgh

VTerm (a commercial terminal program for the CoCo 3) includes the best VT100 emulation I know of for the CoCo and runs under Disk BASIC. *Ultimaterm* (available on Delphi) also offers VT100 emulation, although users report its VT100 emulation is less complete and accurate. There are some OS-9 terminal programs that also offer VT100 emulation. While Kermit packages exist for OS-9, I know of no reasonably usable Kermit implementation running under Disk BASIC.

Blowing Bubbles

When I try to connect a Cannon BJ-300 Bubble Jet printer to the parallel output of my serial-to-parallel converter, I get nothing. Any suggestions? The printer works fine when connected to the parallel port of a PC-clone, and my serial-to-parallel converter works with another printer I have.

Robert R. Wharton, Jr. (BOBWHARTON)
Parkersburg, West Virginia

Most serial-to-parallel converters for the CoCo are designed to be powered either by 5 volts from the printer or via an external wall transformer. It is possible your older printer supplies the necessary 5 volts on Pin 18 of the parallel port, but the Cannon does not. You can either check the manual of the Cannon printer to see if 5 volts is listed on Pin 18, measure the voltage on Pin 18 with a VOM, or check the documentation for your serial-to-parallel converter. It may be necessary to use an external power supply, so be sure to purchase a wall transformer of the correct voltage and polarity, and with the correct connector.

Switching Disk Drives

How would you suggest I employ a physical switch to select between one of two or more disk drives? Can I just connect most of the lines in parallel and switch the drive select lines?

Bob Kemper (BOBKEMPER)
Fort Stewart, Georgia

The clever approach you suggest may work, but it could cause problems related to termination or overloading various signals. Note that you can buy two- and four-way 25-pin switch boxes, and 25 pins are more than enough to switch all used disk drive signals plus a respectable number of ground lines as well. If you made a custom DB-25 to 34-pin female edge connector cable, you could employ such a switch box to completely and cleanly select among disk drives. Two- and four-way 37-pin switch boxes are also available, although for about twice the price of 25-pin switch boxes. If you can't find these switch boxes available cheaply in your area, call Rogers Specialists at (805) 251-3085. Rogers Specialists has the best prices I have seen for switch boxes and DB-25 solder-cup connectors if you buy in lots of five or more.

Dial ZAP for Lightning

During a thunderstorm the power and phone lines near me were hit by lightning. The 2400-bps Hayes modem I had connected at the time does not work. The power supply seems to overheat. I replaced a blown fuse, but the overheating problem continues. Any suggestions?

Jim Reed (JIMREED)
Louisville, Kentucky

The most common cause of overheating in a power supply (that formerly was working properly with the same load) is one or more fused diodes in the rectifier bridge. Your Hayes modem likely uses a simple linear power supply with four diodes in a bridge formation. Desolder and check the diodes for conduction in both directions with an ohmmeter set on Rx10 scale. The diodes should have infinite resistance in one direction and read about midscale in the other direction. If one or more of the diodes conducts fully or nearly so in both directions, it is fried and must be replaced. I suggest using standard, generic 1N5400 diodes (rated at 3 amps, 50 PIV), which are available at Radio Shack (Catalog No. 276-1141), although any 1N5400-series or 1N4000-series diode will likely work fine. The 1N5400-series will likely be more rugged than whatever diode Hayes originally used. I suggest replacing all four diodes if one diode tests bad.

If this does not fix the problem, check the filter capacitors. At this point, an oscilloscope would be helpful to trace the circuit to look for ripple where filtered DC should be. By the way, I use a Hayes 2400 V-series modem that suffered from exactly the same problem (although not due to lightning) and, after I replaced some bad diodes, it worked fine, and has continued to work finefor the last three years.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

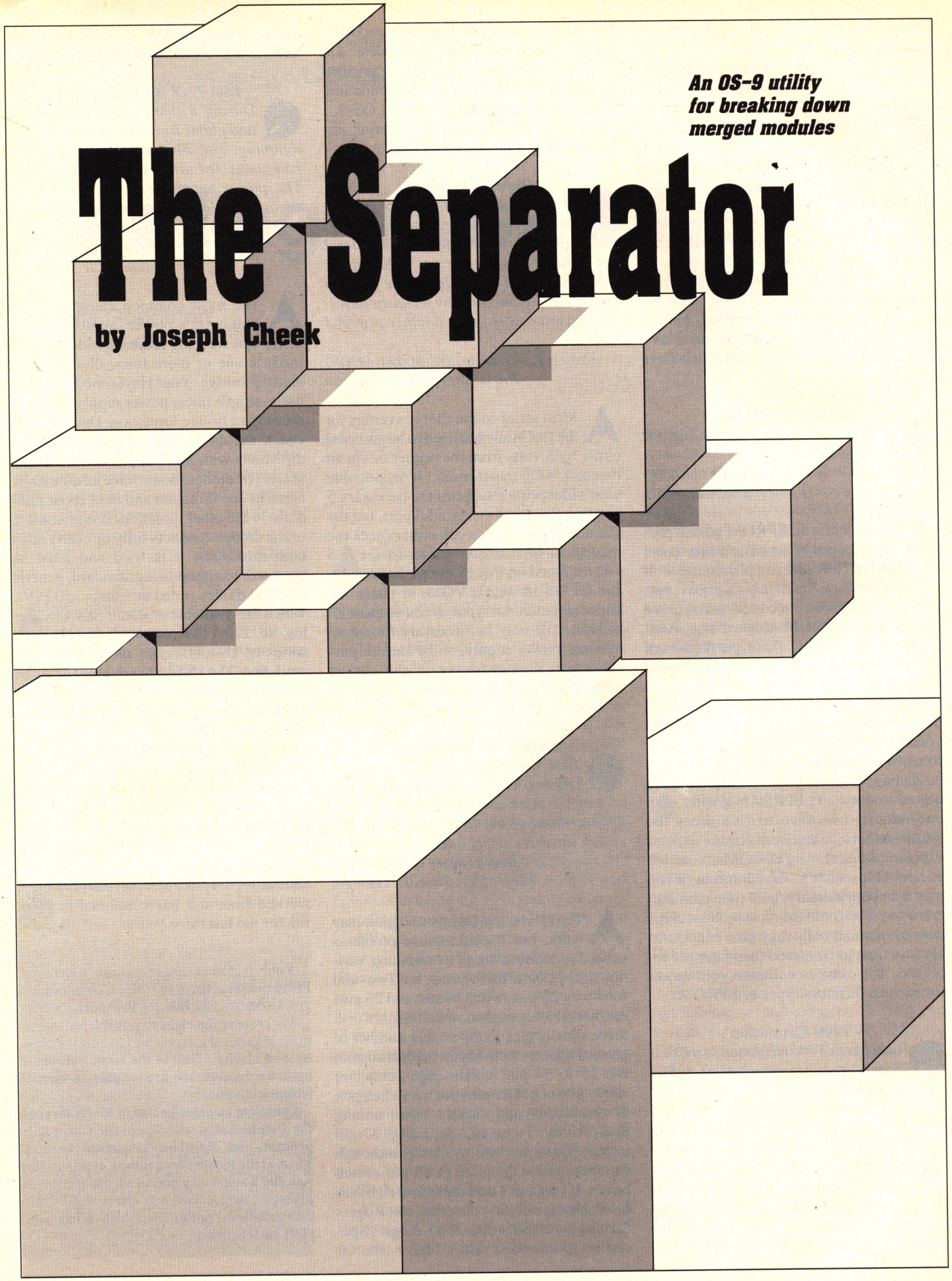
We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services. Then at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt , where you can select the "CoCo Consultations"online form, which has complete instructions.

An OS-9 utility for breaking down merged modules

The Separator

by Joseph Cheek



When I first got OS-9 Level II, I fell in love with it. There are so many things I can do using this operating system. Having a CoCo 3 with only 128K, however, the system quickly runs out of memory. Let's review briefly how OS-9 allocates memory for modules (loaded programs).

Level II assigns memory to modules in 8K blocks — every module loaded into memory takes up the smallest possible amount of memory evenly divisible by 8K. A single module takes up an 8K block even if its actual size is only 12 bytes. To solve the low-memory problem, I discovered I could merge several modules into single files, each slightly less than 8K in size. When one of these files is loaded, the individual modules it contains more completely fill each 8K block, providing much more efficient use of the available memory.

A problem with this approach, though, is getting the merged modules separated, should the need arise (i.e., if I accidentally delete one or more of the original files and need to get it back). I originally thought the solution to this would be to load the merged file and save the individual module(s) from memory to disk. Unfortunately OS-9 Level II does not include a `save` command. (The `save` command comes with the *Development System* package.) What I needed was a utility that would take a merged file and separate it into its component modules. I didn't have access to one, so I wrote *Sep* to do the job.

Making it Go

Sep is a BASIC09 program that bursts modules from a merged file. There are two ways to run *Sep*: With or without a starting filename. If you enter

```
sep ("filename")
```

the program separates all the merged modules in the named file and saves them as individual files on disk. In this mode, nothing except error messages are displayed onscreen.

If you enter `sep` without naming a file, the program prompts you to enter a filename. You may enter `chd` and `dir` at this prompt, as you can with my *Touch* utility (October 1989, Page 72), to change and list directories. When you find the desired file and enter its filename, *Sep* first checks the file to see how many modules it contains. If *Sep* finds only one module in the file, it asks you for another filename. If there is more than one module in the file, however, *Sep* proceeds to list the names and number of all the modules in the file. After displaying this information, the program asks if you want to verify the integrity of the merged modules. If so, press Y and the program uses the `ident` command to check for bad modules. Finally *Sep* separates all the modules in the file, displaying each module's name as it goes.

```
@SEP
Syntax: sep [("<filename>")]
Usage : A utility that separates Merged modules on disk. Prompts for
        <filename> if not supplied on command line. Written in BASIC09,
        uses runb run-time package.
```

Figure 1: Text for Help File

Before running *Sep*, use `chx` to set the *current execution directory* to the directory where the file you want to split is located. Use `chd` to set the *current data directory* to the one where you want the separated modules saved. *Sep* checks for the filename you select in the current execution directory, which is where such files are usually stored. Any file you want to separate must be executable or you will receive an Error 214 (No Permission).

It is important to note that *Sep* saves the individual modules as separate files in the current *data* directory, and it uses each module's name as the filename. Therefore, to avoid conflicts with existing files, make sure you select different data and execution directories. You should also rename the file if it contains a merged module that uses the same name. As a safety measure, consider doing this always.

Regardless of the way you run *Sep*, once it has finished bursting the desired file, it stops execution. To separate another file, you must run *Sep* again.

Entering the Program

The following is a step-by-step approach to getting *Sep* working on your system:

1) RAINBOW ON DISK users should copy the file `sep` from the `CMDS` directory of the RAINBOW ON DISK to the `CMDS` directory of their system disk. (The `CMDS` directory should also contain both `syscall` and `runb`.) Then enter `chd /dd/cmds` and go to Step 7.

2) Start BASIC09 and enter (or load) the program in Listing 1. If you enter it, make sure to save the source code in a file for later use.

3) Run the program in BASIC09's workspace and debug it.

4) Kill `syscall` from BASIC09's workspace by entering

```
kill syscall
```

5) Pack the program into the current execution directory (which should also contain `syscall`) by entering the command

```
pack* sep
```

6) Exit BASIC09 and change your current data directory to the directory into which you packed `sep`.

7) Merge `sep` and `syscall` into a file called `s` by entering

```
merge sep syscall >s
```

8) Delete `sep` and rename `s` to `sep`. Copy it to your normal system execution directory (usually `CMDS`) if necessary. This directory should contain the file `runb`.

9) Make `sep` an executable file using

```
attr sep e pe
```

10) Use `edit` or a text editor to add the text in Figure 1 to the `helpmsg` file in your `SYS` directory.

11) You can now use *Sep*.

Notes on Using *Sep*

- *Sep* will not separate text files! It works for merged executable modules only. There are other utilities for text files.
- Only the superuser can use *Sep*. This is not a problem if you are running a single-user system.
- You cannot use the `chd`, `dir` or `ident` commands when running *Sep* on a Hi-Res screen (anything other than 32-column) if you have only 128K.

I find *Sep* to be a real lifesaver. I hope you have as much use for it as I have! If you have any questions or comments, please call or write me. ❑

Joseph Cheek began using a CoCo 1 nine years ago and has been programming since then. He particularly enjoys using OS-9 and writing programs in BASIC09 and C. He can be contacted at 6007 West Eaton Way, Salt Lake City, UT 84118-8215, (801) 968-5579. Please include an SASE when requesting a reply.

The Listing: sep.b09

```
PROCEDURE sep
 0000       TYPE regs=cc,a,b,dp:BYTE; x,y,u:INTEGER
 0025       DIM r:regs
 002E       TYPE head=sync,siz,oname:INTEGER
 0041       DIM h:head
 004A       DIM s128:STRING[128]
 0056       DIM file,file2:STRING[99]
 0066       DIM mname:STRING[29]
 0072       DIM s16:STRING[16]
 007E       DIM key,s1:STRING[1]
 008E       DIM c1:REAL
 0095       DIM c,c2,c3,c4:INTEGER
 00A8       DIM errnum,ipath,opath,ccode,ltr,ccode:BYTE
 00C3       DIM parm:BOOLEAN
 00CA       PARAM pfile:STRING[99]
 00D6       parm=FALSE
 00DC       ON ERROR GOTO 100
 00E2       ccode=12
 00E9       RUN syscall(ccode,r)
 00F8       IF r.y<>0 THEN
 0107         PRINT #2,"sep: user must be superuser"
 012A         END
 012C       ENDIF
 012E       file=pfile
 0136       parm=TRUE
 013C       GOTO 3
 0140 1     PRINT CHR$(12);
 0149       PRINT "Sep OS9 diskfile separator"
 0167       PRINT "Written by Joseph Cheek for CSS"
 018A       PRINT
 018C 2     INPUT "Name of file to separate? ",file
 01B1       file2=file
 01B9       RUN ltou(file2)
 01C3       IF LEFT$(file2,3)="DIR" THEN
 01D5         SHELL file2
 01DA         GOTO 2
 01DE       ENDIF
 01E0       IF LEFT$(file2,4)="CHD " THEN
 01F3         CHD RIGHT$(file2,LEN(file2)-4)
 0200         GOTO 2
 0204       ENDIF
 0206       PRINT "These files are currently part of "; file; ":"
 0234       PRINT
 0236 3     c1=.0
 0244       c2=0
 024B       OPEN #ipath,file:READ+EXEC
 0257 4     SEEK #ipath,c1
 0264       GET #ipath,h
 026E       IF h.sync<>$87CD THEN
 027E         PRINT CHR$(7); "Module header is incorrect!"
 02A1         IF NOT(parm) THEN
 02AB           PRINT
 02AD           GOTO 2
 02B1         ELSE
 02B5           END
 02B7         ENDIF
 02B9       ENDIF
 02BB       GOSUB 200
 02BF       IF NOT(parm) THEN
 02C9         PRINT mname,
 02CF       ENDIF
 02D1       c1=c1+h.siz
 02E1       GOTO 4
 02E5 5     CLOSE #ipath
 02EE       IF NOT(parm) THEN
 02F8         PRINT
 02FA       ENDIF
 02FC       IF c2<2 THEN
 0308         PRINT "Doesn't need separating!"
 0324         IF parm THEN
 032D           END
 032F         ELSE
 0333           PRINT
 0335           GOTO 2
 0339         ENDIF
 033B       ENDIF
 033D       IF NOT(parm) THEN
 0347         PRINT "Total of "; c2; " files listed.  Run Ident on file?"
 037D         PRINT "(Ident must be in current ex. dir or in mem) [y/N]? ";
 03B6         GET #0,key
 03BF         RUN ltou(key)
 03C9         PRINT
 03CB         IF key="Y" THEN
 03D8           SHELL "Ident "+file+" -s -x"
 03EF         ENDIF
 03F1         PRINT
 03F3         PRINT "Now separating..."
 0408       ENDIF
 040A       c1=.0
 0415       OPEN #ipath,file:READ+EXEC
 0421       FOR c3=1 TO c2
 0432         SEEK #ipath,c1
 043C         GET #ipath,h
 0446         GOSUB 200
 044A         IF NOT(parm) THEN
 0454           PRINT mname; "...";
 0460         ENDIF
 0462         CREATE #opath,mname:WRITE
 046E         c4=h.siz
 0479         SEEK #ipath,c1
 0483         WHILE c4>127 DO
 048F           GET #ipath,s128
 0499           PUT #opath,s128
 04A3           c4=c4-128
 04AE         ENDWHILE
 04B2         WHILE c4>15 DO
 04BE           GET #ipath,s16
 04C8           PUT #opath,s16
 04D2           c4=c4-16
 04DD         ENDWHILE
 04E1         WHILE c4>0 DO
 04ED           GET #ipath,s1
 04F7           PUT #opath,s1
 0501           c4=c4-1
 050C         ENDWHILE
 0510         IF NOT(parm) THEN
 051A           PRINT "done"
 0522         ENDIF
 0524         CLOSE #opath
 052A         c1=c1+h.siz
 053A       NEXT c3
 0545       IF NOT(parm) THEN
 054F         PRINT "Done separating."
 0563       ENDIF
 0565       CLOSE #ipath
 056B       END
 056D 100   errnum=ERR
 0576       IF errnum=56 THEN
 0582         GOTO 1
 0586       ENDIF
 0588       IF errnum=211 THEN
 0594         GOTO 5
 0598       ENDIF
 059A       PRINT #2,"ERROR #"; errnum
 05AD       END
 05AF 200   c=0
 05B9       mname=""
 05C0       REPEAT
 05C2         SEEK #ipath,h.oname+c+c1
 05D8         GET #ipath,ltr
 05E2         mname=mname+CHR$(LAND(ltr,127))
 05F2         c=c+1
 05FD       UNTIL c>28 OR ltr>127
 060F       c2=c2+1
 061A       RETURN

PROCEDURE ltou
 0000       DIM workstring:STRING[40]
 000C       DIM count:INTEGER
 0013       DIM char:BYTE
 001A       PARAM answer:STRING[40]
 0026       workstring=""
 002D       FOR count=1 TO LEN(answer)
 003F         char=ASC(MID$(answer,count,1))
 004E         IF char>96 AND char<123 THEN
 0061           char=char-32
 006C         ENDIF
 006E         workstring=workstring+CHR$(char)
 007B       NEXT count
 0086       answer=workstring
 008E       END
```

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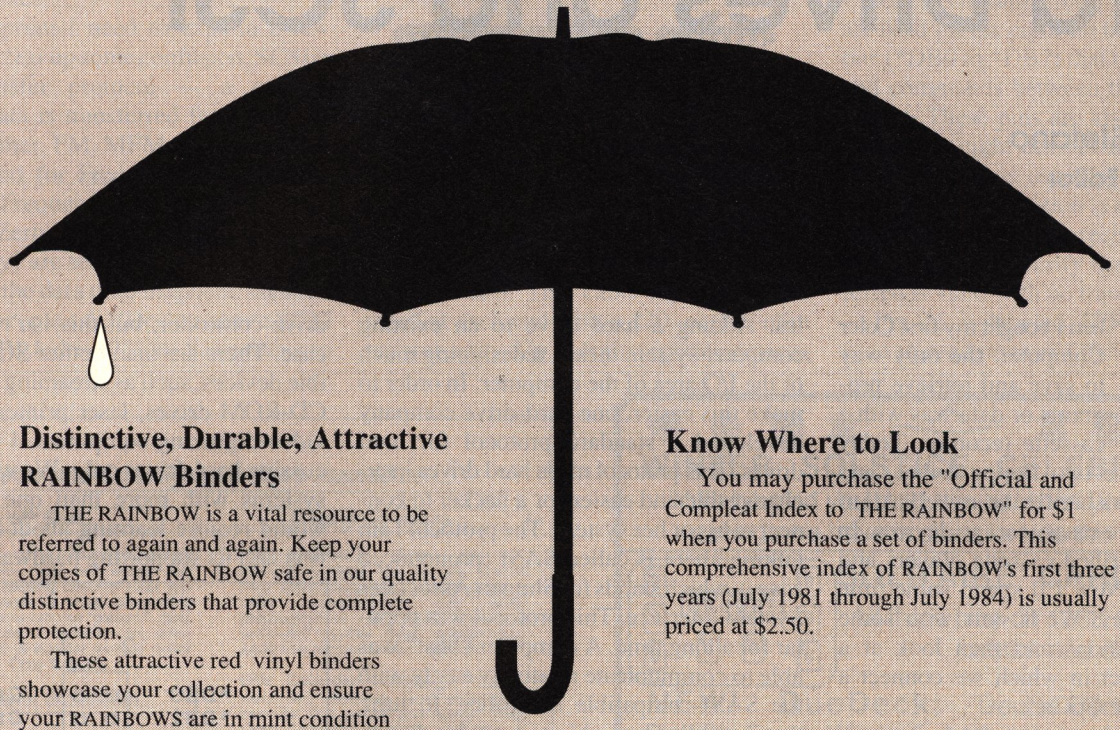

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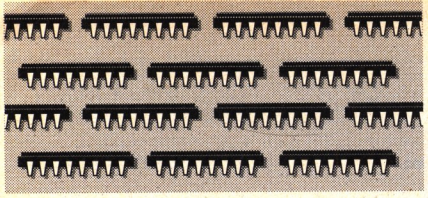

Hard Drives and SCSI

by Tony DiStefano
Contributing Editor

When I bought my first Color Computer, the only way to save and retrieve programs or data was with a cassette recorder. Today most of us have two floppy drives, and many of us have a hard drive as well. All of these devices are mass-storage devices. In the past, I described cassette players and floppy drives. Now I'll spend some time with hard drives. We'll start with some general descriptions and then look at a hardware project in which we connect a hard drive to the CoCo.

A hard drive is very similar to a floppy drive, at least in theory. It consists of two or more read/write heads and one or more platters coated with a magnetic substrate. The platters spin faster (typically 3600 rpm) and the heads step with finer precision. But the principal of magnetic-pulse recording is the same. Because of the greater precision and finer tolerances, the recording surfaces and head assembly are sealed in a dust-free housing. And the platters are made from rigid aluminum, hence the name hard disk. There are other physical differences, but the theory is the same. When hard drives first appeared on the market, they were slow, bulky and not too efficient. But they were still faster and could store much more data than floppy drives.

A hard drive, like a floppy drive, requires a controller and supporting electronics. Adding a hard drive to an existing computer system means redesigning much of the I/O area of the computer. In order to make this easier, one hard-drive company developed a standard protocol for hard drives. This protocol made hard drives interchangeable and easier for a hacker to connect to his or her system. The protocol I am talking about is called SASI (pronounced *sassy*), which stands for Shugart Associates System Interface. This protocol was popular for a long time. A computer "host" was able to communicate relatively easily with the SASI-compatible controller. In turn, the controller was able to transfer data to and from the hard drive.

As time went by, changes and improvements were made to this protocol until it finally became an ANSI specification (ANSI X3.131-1986) called SCSI (pronounced *scuzzy*), which stands for Small Computer System Interface. Today, no one uses the SASI protocol. The SCSI protocol, though certainly not the only protocol, is very popular with such computers as the Apple Macintosh, Atari ST, Commodore Amiga and our own Color Computer.

To fully describe the SCSI protocol would require a book at least twice the size of this magazine. Instead I will give you only the basics. After we finish with the next few articles, you'll know enough to build a CoCo adapter for a SCSI drive.

SCSI is a protocol for communication between a host computer and other devices. The host in our case is the CoCo. In SCSI terms, the host is also known as the Initiator because it starts, or initiates, a sequence of events that usually results in some form of data transfer. The SCSI device used for data transfer is known as a Target, and it responds only when it is addressed. In most cases the Target is a SCSI-compatible hard-drive controller, but this isn't always the case. There are many other SCSI-compatible devices, such as streaming tape drives, CD-ROM drives, laser printers and even video-digitizing equipment. I will be discussing hard drives only. We won't look at systems with more than one host. That would require learning about bus arbitration and its supporting hardware, which is beyond what I want to accomplish here. Besides, most CoCoists use only one computer at a time.

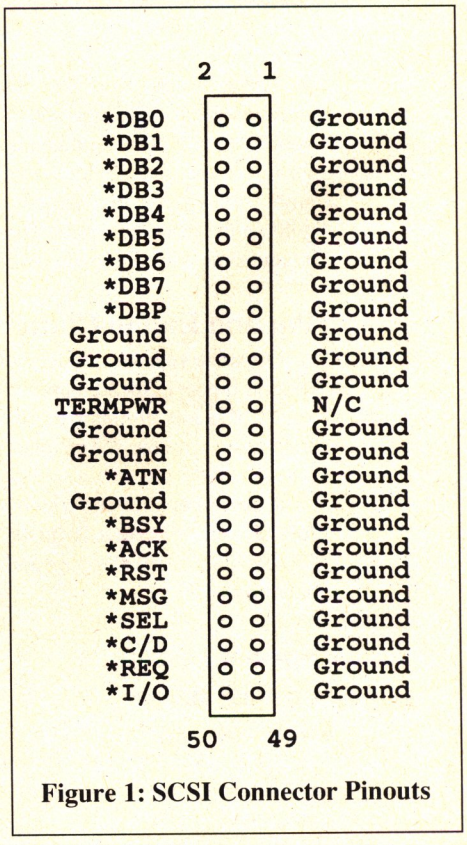

Figure 1: SCSI Connector Pinouts

A typical system starts with a computer. Connected to the computer's I/O bus is a

---

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's username on Delphi is DISTO.

SCSI host adapter, which has two sections. The first section is the hardware interface connected to the computer. The second section is the SCSI interface connected to other SCSI devices. This is the SCSI bus. Connected to the other end of the SCSI bus is the controller. A SCSI controller also has two sections. The first section of the controller is connected to the SCSI bus. The second section is connected to a hard drive or other device.

At this point I need to explain a few things and clear up some confusion. SCSI is a data-transfer protocol — a method whereby data is transferred from one device to another. FM, MFM, NRZ and RLL (which stand for Frequency Modulation, Modified Frequency Modulation, Non-Return to Zero and Run Length Limited, respectively) are techniques used to actually record the data onto magnetic media. I often hear people ask, "Do you have a SCSI drive or an RLL drive?" One has nothing to do with the other. You may have both or neither, depending on your system. So remember: FM, MFM, NRZ and RLL are recording methods while ST-506, ST-412, SASI, SCSI, IDE and ESDI are data-transfer protocols. Usually you need one of each. For more information on recording methods and protocols, see "A Hard Drive for Your CoCo" (March 1989, Page 44) by Marty Goodman.

The SCSI Bus

The SCSI protocol is defined by a finite set of parameters. One of these parameters is the cable through which the data is transferred. The SCSI protocol uses 50-pin cable with a maximum length of six meters, or about 19 feet. This cable must be terminated at each end with a 220- or 330-ohm resistor array. Up to eight separate devices can be connected to this cable at one time, each using one of eight bits as a device ID. Figure 1 shows the pin-out for a SCSI cable.

Note that all the odd-numbered pins (except Pin 25, which is not connected) are signal ground. This separates every signal pin from its adjacent neighbor and provides a good ground plane. Pins 20, 22, 24, 28, 30 and 34 are unused and are also connected to the signal ground.

The even-numbered pins from 2 to 16 are used for the eight-bit bidirectional data bus (*DB0 to *DB7) that transfers all data and commands between the Host and the Target. These pins are also used to select one of the eight devices during the select phase. Pin 18 is used for parity (*DBP). When the parity option is enabled, this pin is used to generate or receive a parity bit, which is used to verify that the data transferred is valid with no transmission errors.

Pin 26 is labeled TERMPWR and is used to send power (4 to 5.25 volts) to the

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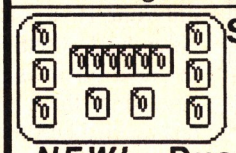

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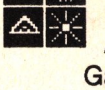

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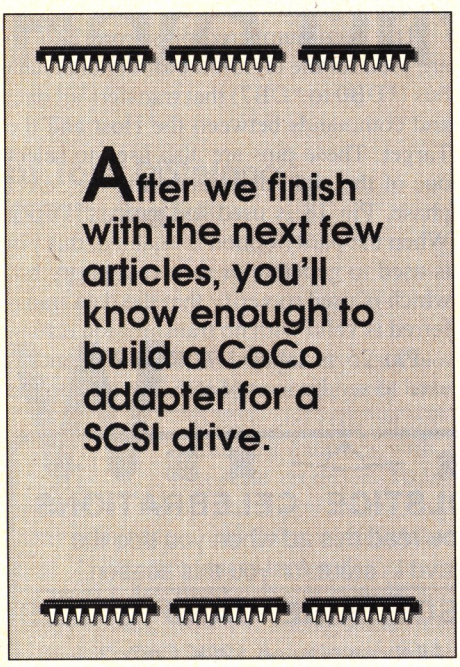
terminating resistors. This pin is used to establish signal termination even while the devices are turned off.

The Attention pin (*ATN, Pin 32) carries an active-low signal that is used by the Host to signal any device that it has a message waiting. This signal can be started at any time except during the arbitration or bus-free phases.



The even-numbered pins from 36 to 50 also carry active-low signals, as indicated by the asterisks preceding their designations. Their functions are as follows:

Pin 36 — *BSY: The Busy pin; an "OR-tied" signal indicating the bus is in use. This signal stays active throughout the entire function cycle.

Pin 38 — *ACK: The Acknowledge pin; a double-edged signal that is driven by the Host as part of the Request/Acknowledge (REQ/ACK) handshaking method of data transfer.

Pin 40 — *RST: The Reset pin; an "OR-tied" signal used to terminate any and all functions and to restore the bus to its idle state.

Pin 42 — *MSG: The Message pin; used by the Host to tell the Target that a message phase has begun.

Pin 44 — *SEL: The Select pin; used by the Host to select a Target. This pin is used along with one of the eight data lines to activate one of eight possible devices.

Pin 46 — *C/D: The Command/Data pin; is driven by the Target and indicates whether Control or Data information is present on the data bus. A Low signal indicates Control information.

Pin 48 — *REQ: The Request pin; a double-edged signal driven by the Target to indicate a request for a REQ/ACK data-transfer handshake.

Pin 50 — *I/O: The Input/Output pin; driven by the Target. This signal controls the direction of data flow through the data bus. A Low indicates input to the Target.

SCSI Phases

The SCSI architecture uses eight phases, and the bus can never be in more than one phase at any given time. These phases are

- Bus free
- Arbitration
- Selection
- Reselection
- Command
- Data
- Status
- Message

As its name implies, the SCSI system is in the first phase, bus-free, during periods of inactivity on the bus. Both the *SEL and *BSY signals are False (either deselected or inactive).

The arbitration phase occurs when more than one Host "fights" to see who will get to use the bus next. (Since we are dealing with only one Host, there is no need to fight.) After the dust settles, and a winner emerges, the next phase is device selection. In our case, since there is only one Host, the only test needed before going into the selection phase is to see that both *SEL and *BSY are false.

The selection phase allows the Initiator (Host) to select a Target for the purpose of initiating a function (e.g., a Read or Write command). In a single-host system, the Initiator (that's the CoCo) must output the desired Target's SCSI ID on the data bus and assert *SEL.

The next phase, reselection, can be skipped since it works in conjunction with the arbitration phase. In a single Initiator system, no arbitration or reselection phases are needed. After the selection phase is complete, the addressed Target responds by asserting the *BSY signal. At this point, the SCSI bus reaches the information-transfer phases.

The command, data and message phases are grouped together as information-transfer phases because they all use the data bus to transfer information. The *C/D, *I/O and *MSG signals are used to distinguish between the different information-transfer phases. The Target outputs these three signals and therefore controls all changes from one phase to the next. All information-transfer phases require the use of the data bus. All data on the bus, regardless of phase of the bus, is transferred by the same method. This method is the REQ/ACK handshake.

In a normal sequence of events, the first information-transfer phase is the command phase. The command phase allows the Target to request command information from the Initiator. The Initiator must then transmit a command. A SCSI command consists of six or more bytes, depending on to which group the command belongs. The most often used commands, such as read and write, require six bytes. Other commands may require as many as 12 bytes.

After the command phase is complete, the Target executes the given command. If the command requires data to be transferred, the Target changes the current phase to a data phase. This phase can be a data-in phase or a data-out phase, depending on the type of command issued. At this point all necessary data is transferred via the data bus. The Target determines when all data has been transferred and changes from the data phase to the status phase.

The status phase allows the Target to request status information be sent to the Initiator. The Initiator must then recognize the status phase and read the status information. This phase is used to detect an error. If for any reason a function is not completed normally, the status byte indicates a check condition. It is up to the Host to determine what went wrong.

Upon completion of the status phase, the Target goes into the final phase, the message phase. The message phase allows the Target to request a single message to be sent to the Initiator. After the Initiator reads the message data, the Target considers the function finished and releases all control lines, including the *BSY line. At this point, the operation can start again.

At any time, the Initiator may inform a Target that it has a message ready by asserting the *ATN signal. The Target may respond with the message phase.

To recap the complete operation described above, let's follow an example. The Host (your CoCo) initiates a read-sector command. The sequence of events is as follows: The Initiator checks that the bus is free, then selects the drive. The Target drive responds by asking for a command. The command is transferred, followed by the data the CoCo requested. The Initiator reads data until the Target changes the phase to the status phase. The Initiator reads the status bytes, then reads the message byte. It then frees the bus for the next function.

By now you should have a basic understanding of how the SCSI protocol works. Next time, I will continue by discussing timing and commands used for the SCSI protocol.

Novices Niche

Christmas Home

by Danny and Peggy Eary

16K Extended

Sitting around the house, watching the snow fall, gave us the idea for this program. Enter the program and run it, and let the Color Computer join your holiday festivities. We were fairly new to the CoCo when we wrote this, but we found it very easy to create. It should not be too difficult to modify for your personal use. If we can do it, you can, too.

The Listing: XMASHOME

```
1 'CHRISTMAS HOME
2 'BY DANNY AND PEGGY EARY
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
10 PMODE 1,1:PCLS
15 SCREEN1,0
20 PCLS 3
25 COLOR 1,0
30 CIRCLE(200,25),5
40 LINE(100,185)-(180,125),PSET,
B
45 LINE-(140,90),PSET
50 LINE-(100,125),PSET
55 PAINT(135,115),4,1
60 LINE(110,160)-(125,130),PSET,
B
65 LINE(155,160)-(170,130),PSET,
B
70 PSET(134,157,1)
75 PAINT(120,180),0,1
76 LINE(130,130)-(149,185),PSET,
B
77 LINE (160,105)-(160,90),PSET
 'CHIMNEY
78 LINE- (175,90),PSET  'CHIMNEY
79 LINE- (175,115),PSET  'CHIMNE
Y
80  'SMOKE STARTS HERE
81 X=167:Y=89  'CIRCLE CENTERPOI
NT
85 SP=0:EP=0:  'CIRCLE START AND
 END POINT
90 FOR R=1 TO 50 STEP 3
100 CIRCLE(X+R,Y-R),R,4,1,SP,EP
 'SMOKE
105 NEXT R
120 LINE(101,135)-(41,185),PSET,
B
130 LINE(91,140)-(51,185),PSET,B
140 PAINT(55,138),0,1
145 PAINT(89,183),4,1
150 FOR X=1 TO 500:NEXT X
160 PAINT (89,183),2,1
170 FOR X=1 TO 500:NEXT X
171 PAINT(89,155),4,1
172 CIRCLE (200,40),30,,1,.13,.6
3
173 CIRCLE(230,10),52,,1,.29,.48

174 PAINT(89,155),4,1
176 CIRCLE (20,20),5
196 Y=RND (192)-1
197 C=RND (9)-1
198 PSET (X,Y,C)
199 CIRCLE (117,150),4,2
200 CIRCLE (155,180),4,1
201 CIRCLE(175,180),4,1
202 CIRCLE (165,180),4,1
203 CIRCLE(163,150),4,2
204 CIRCLE (125,180),4,1
205 CIRCLE (115,180),4,1
206 CIRCLE(105,180),4,1
207 CIRCLE (140,110),15,2
208 CIRCLE (60,50),4,1
209 CIRCLE (230,55),4,1
210 CIRCLE(115,40),4,1
211 CIRCLE (150,20),4,1
212 CIRCLE (139,145),9
213 X=RND (300)-1
214 Y=RND (192)-1
215 C=RND(9)-1
216 PSET (X,Y,C)
217 CIRCLE (70,160),12
218 CIRCLE (140,85),4,2
219 CIRCLE (200,180),4,1
220 CIRCLE (210,180),4,1
221 CIRCLE(220,180),4,1
222 CIRCLE (230,180),4,1
223 CIRCLE (205,170),4,1
224 CIRCLE (215,170),4,1
225 CIRCLE (225,170),4,1
226 CIRCLE(211,160),4,1
227 CIRCLE (220,160),4,1
228 CIRCLE (215,150),4,1
229 CIRCLE (70,165),4,2
230 CIRCLE (140,110),4,6
300 GOTO 213
```

Poke Text

by Keiran Kenny

16K Standard

As most CoCo users know, one way to get text on the screen is by using BASIC's PRINT command. Less known, though, is a method of poking text directly to the screen.

Memory locations 1024 through 1535 are the character locations for the 32-column screen. By poking the ASCII values of characters into these locations, we can tell the CoCo to print text on the screen.

POKETEXT is designed to provide an onscreen tutorial for using the POKE command in this manner. Enter the listing, run it and learn. Alternatively, read the listing and start using this method in your programs right away. One note on using direct-poked text, however: Programs that use this technique will not work properly on the CoCo 3's 40- and 80-column screens. Keep this in mind when writing your own programs.

The Listing: POKETEXT

```
1 'POKE TEXT
2 'BY KEIRAN KENNY
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
10 POKE65494,0:CLS0:GOTO60
20 FORX=1TO LEN(A$):AA$=MID$(A$,
X,1)
30 IFAA$>CHR$(31)ANDAA$<"@"THENA
=ASC(AA$):GOTO50
40 A=ASC(AA$)-64
50 POKEPP,A:PP=PP+1:NEXT:RETURN
60 PP=1032:A$="<<<POKETEXT>>>":G
OSUB20
70 PP=1088:A$="BY KEIRAN KENNY,
THE HAGUE, 1986":GOSUB20
80 A$="***INSTRUCTIONS***":PP=11
67-INT(LEN(A$)/2):GOSUB20
90 PP=1216:A$="1) THE POKE POSIT
ION (PP) IS THEPRINT@ POSITION +
1024":GOSUB20
100 PP=1312:A$="2) PUT TEXT IN A
 STRING LABELLEDA$. ENCLOSE IT I
N QUOTES AND    GOSUB20":GOSUB20
110 PP=1440:A$="3) USE THE SPACE
BAR TO FILL OUT LINES FOR A NEAT
 DISPLAY":GOSUB20
120 A$="PRESS ANY KEY.":PP=1519-
INT(LEN(A$)/2):GOSUB20
130 EXEC44539:CLS0
140 PP=1024:A$="4) TO CENTER TEX
T EASILY FOLLOW THE EXAMPLES IN
LINES 80 & 120.":GOSUB20
150 PP=1120:A$="5) YOU CAN ALSO
PRINT LOWER CASELETTERS ON A BLA
CK (CLS0) SCREENBUT YOU CANNOT P
RINT NUMBERS OR PUNCTUATION AND
MATH SIGNS LIKE THESE: 123456789
0#$%&'()*:=-+;?/>.<,[]\!";GOSUB2
0
160 PP=1344:A$="6) TO USE THE DO
UBLE QUOTE AS IN":GOSUB20:POKE13
76,34:PP=1377:A$="TITLE":GOSUB20
:POKE1382,34:PP=1384:A$="SEE LIN
E 180.":GOSUB20
170 A$="PRESS ANY KEY.":PP=1455-
INT(LEN(A$)/2):GOSUB20:EXEC44539
:CLS0
```

```
180 PP=1088:A$="I HOPE YOU WILL
FIND 'POKETEXT' EASY TO USE IN Y
OUR PROGRAMS.   IT'S UP TO YOU N
OW TO EXPERIMENTWITH IT AND USE
IT FOR ATTRAC-  TIVE TITLE SCREE
NS OR WHATEVER  YOU LIKE TO USE
IT FOR.":GOSUB20
190 A$="TO END PROGRAM PRESS ANY
 KEY.":PP=1327-INT(LEN(A$)/2):GO
SUB20:EXEC44539:POKE65494,0:CLS:
END
200 GOTO200
```

Disk Table

by Steve Ricketts

16K Disk

If you fiddle with disk utilities, especially disk editors, you no doubt tire of having to flip back and forth between decimal and hexadecimal values. I have done this for years and finally decided there was a better way. So I wrote *Disk Table*.

Disk Table lists to your printer a reference chart showing tracks 0 through 39 and their respective granule allocations for a disk. The output provides both decimal and Hex values. With this reference at your side, you won't have to make the conversion yourself anymore.

To fit the entire table on one page I used my Epson printer's condensed mode (15 characters per inch, 8 lines per inch). You may have to edit Line 10 to insert the code your printer requires to use condensed print. Also, if your printer is set up to use a different baud than the CoCo's default of 600, either poke location 150 with the appropriate value before running the program, or add such a line to the program itself.

The Listing: DISKTABL

```
0 'DISK TABLE
1 'Written by Steve Ricketts
2 'Copyright (C) December 1991
3 'by Falsoft, Inc.
4 'Rainbow Magazine
5 'This program will print out
   a reference table which can
   be used to easier mess with
   disk utilities, saving the
6 'hassle of converting hex to
   decimal and decimal to hex.
7 '*****************************
8 '
9 '
10 PRINT#-2,CHR$(27);CHR$(15)
11 'Above is Epson code for
    condensed print. Replace
    with the code for your
    individual printer.
20 PRINT#-2,"Track DEC/HEX Secto
r DEC/HEX    Gran DEC/HEX"
30 PRINT#-2,STRING$(44,"-"):PRIN
T#-2,"";
40 FOR T=0 TO 39
50 IF T=17 THEN NEXTT
60 PRINT#-2,"Track ";RIGHT$(STR$
(T),2);" / ";:T$="0"+HEX$(T):PRI
NT#-2,RIGHT$(T$,2);:T$="":PRINT#
-2," Sector  1";"/01","Gran ";RI
GHT$(STR$(G),2);" / ";:G$="0"+HE
X$(G):PRINT#-2,RIGHT$(G$,2):G$="
":G=G+1
70 PRINT#-2,"Track ";RIGHT$(STR$
(T),2);" / ";:T$="0"+HEX$(T):PRI
NT#-2,RIGHT$(T$,2);:T$="":PRINT#
-2," Sector 10";"/0A","Gran ";RI
GHT$(STR$(G),2);" / ";:G$="0"+HE
X$(G):PRINT#-2,RIGHT$(G$,2):G$="
":G=G+1
80 NEXTT
```

DeSpace, DeSpace

by John Musumeci

32K Disk

When writing BASIC programs, most people use spaces liberally. Sometimes, though, these extra spaces take up memory the program could use. *DeSpace* is a small utility that allows you to remove unnecessary spaces from your BASIC programs. It does not remove the necessary spaces from text statements such as PRINT and INPUT, though.

To use *DeSpace*, first save your program in ASCII (using the ,A option). Then run DESPACE, enter the name of your program at the prompt, and your program is rewritten to disk without the extra spaces.

The Listing: DESPACE

```
0 'DESPACE
1 'WRITTEN BY JOHN MUSUMECI
2 'COPYRIGHT (C) DECEMBER 1991
3 'BY FALSOFT, INC.
4 'RAINBOW MAGAZINE
5 '*****************************
10 CLEAR9000:M=200:DIMA$(M),C$(M
):CLS
20 PRINT@70,"NAME OF PROGRAM TO
BE":PRINT@100,"MODIFIED";:SOUND2
00,1
30 INPUTD$:D$=D$+"/BAS"
35 PRINTD$
40 CLS:PRINT@73,"L I S T I N G"
50 OPEN"I",#1,D$:A=0
60 IFEOF(1)=-1 THEN100
70 LINEINPUT#1,A$(A):PRINTA$(A)
80 FOR X= 1 TO 250:NEXT X:A=A+1
90 GOTO60
100 CLOSE#1:A=A-1
125 CLS:PRINT"MODIFIED PROGRAM L
ISTING":PRINT:PRINT
130 FOR I=0 TO A:C$(I)="":S=0
140 L=LEN(A$(I))
150 FOR B=1 TO L
160 B$=MID$(A$(I),B,1)
170 IF B$=CHR$(32) AND S=0 THEN
S=1:GOTO190
180 IF B$=CHR$(32) THEN NEXT B
190 C$(I)=C$(I)+B$
195 IF B$=CHR$(34) THEN 510
197 IF B$=CHR$(39) THEN 550
200 NEXT B
205 PRINTC$(I)
210 NEXT I
300 OPEN "O",#1,D$
310 FOR I=0 TO A
320 PRINT#1,C$(I)
330 NEXT I
340 CLOSE #1
500 CLS:PRINT"COMPLETED":SOUND20
0,1:END
510 B=B+1:FOR BB=B TO L:B$=MID$(
A$(I),BB,1):C$(I)=C$(I)+B$
520 IF BB=L THEN B=BB:GOTO205
530 IF B$<>CHR$(34) THEN NEXT BB
540 IF B$=CHR$(34) THEN B=BB:GOT
O 200
550 B=B+1:FOR BB=B TO L:B$=MID$(
A$(I),BB,1):C$(I)=C$(I)+B$:NEXT
BB
560 GOTO 205
```

Screen Selector

by Jim Knoppow

CoCo 3

When programming, I often need to determine a good set of colors and other values to make my programs look good. I wrote SCREENS to help with this chore. When you run the program, you can adjust the foreground, background and border colors, and the shape and blink rate of the cursor for the 40- and 80-column text screens. When you are satisifed, choose the menu option to see the current settings, then poke those values in your own program as directed.

The Listing: SCREEN

```
1 'SCREEN SETUP UTILITY
2 'WRITTEN BY JIM KNOPPOW
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
10 O=126:CLS:PRINT@134,"SCREEN D
EFRUSTRATOR":PRINT@168,"BY JIM K
NOPPOW":PRINT@229,"PRESS BREAK T
O RETURN TO":PRINT@263,"MENU AT
ANY TIME":FOR X=1TO900:NEXT:CLS:
ON BRK GOTO20
20 WIDTH32:CLS:PRINT@14,"MENU":P
RINT@66,"1. STOP CURSOR BLINK":P
RINT@98,"2. CURSOR BLINK RATE":P
RINT@130,"3. SCREEN COLORS":PRIN
T@162,"4. CURSOR TYPE":PRINT@194
,"5. BORDER COLOR":PRINT@226,"6.
 SEE VALUES CHOSEN":PRINT@258,"7
. ORIGINAL SCREEN
30 G=VAL(INKEY$):IFG>7 OR G<1 TH
EN 30 ELSE ON G GOSUB 50,60,70,8
0,90,100,110
40 GOTO20
50 WIDTH40:POKE&HF77F,&H12:PRINT
"POKE &HF77F, &H12. DEFAULT VALU
E= 7": PRINT"PRESS ANY KEY TO RE
```

```
TURN":EXEC44539:RETURN
60 WIDTH40:POKE&HF77F,7:INPUT"FE
ED ME A NUMBER FROM 1 TO 255";S:
POKE&HF78C,S:LINE INPUT"HIT ENTE
R TO RETURN";D$:RETURN
70 WIDTH40:CLS:FORX=0TO255:POKE&
HFE08,X:CLS:PRINT"TESTING POKE &
HFE08, ";X;" DEFAULT=0":PRINT"HI
T ENTER":EXEC44539:NEXT:RETURN
80 WIDTH40:CLS:FORX=0TO255:POKE&
HF7A3,X:CLS:PRINT"TESTING POKE&H
F7A3,";X;" DEFAULT=64":INPUT"PRE
SS ENTER";D$:NEXT:RETURN
90 WIDTH40:CLS:FORX=0TO63:POKE&H
FF9A,X:O=X:CLS:PRINT"TESTING POK
E &HFF9A,";X;" DEFAULTS ALWAYS T
O 126 WHEN CHANGING WIDTH":PRINT
"WORKS ONLY WHILE RUNNING PROGRA
MS":INPUT"PRESS ENTER";D$:NEXT:R
ETURN
100 WIDTH40:CLS:H=PEEK(&HF78C):I
=PEEK(&HFE08):J=PEEK(&HF7A3):PRI
NT"BLINK  F78C=";H:PRINT"SCREEN
FE08=";I:PRINT"CURSOR F7A3=";J:P
RINT"BORDER FF9A=";O:PRINT"QUIT
PROGRAM":INPUT"TYPE <Y>ES OR <N>
O";X$:IF X$="Y" OR X$="N"GOTO120
ELSEGOTO100
110 WIDTH40:POKE&HF77F,7:POKE&HF
78C,11:POKE&HFE08,0:POKE&HFF9A,1
26:POKE&HF7A3,64:RETURN
120 IF X$="Y" THEN END ELSE RETU
RN
```

Check Disk
by Mark Page

CoCo 3 Disk

I wrote CHKDSK as a mock-up of the MS-DOS utility of the same name. This program reads the directory track and tells you the total number of bytes used by each entry, the number of bytes used for system controls and the directory, and also the number of free bytes remaining on the disk.

The program is written in such a way as to work with 35-, 40- and 80-track disks. However, because Disk BASIC does not set the granule allocation table (GAT) until a file is saved, CHKDSK returns erroneous readings on newly formatted disks. The program also sets the pokes for double-sided drives — if your drives can handle this, CHKDSK reads sides 0, 1, 2 and 3. Finally, the program sets the drives for a step rate of 6 milliseconds.

CHKDSK runs on any text screen, but it was designed for the 32-column screen. You can alter the values in Line 200 to set the screen pause for 40- and 80-column screens. The printer speed is set to 4800 baud in Line 20, but since the CPU is set to double speed with the high-speed poke, the effective printer speed is 9600 baud. Change the value poked into Location 150 in Line 20 to 41 for 2400 baud or 180 for 600 baud. Make sure you slow the CPU by entering POKE 65496,0 before saving the program to disk.

The Listing: CHKDSK

```
1 'CHKDSK UTILITY
2 'WRITTEN BY MARK PAGE
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
10 POKE&HD89F,65:POKE&HD8A0,66:P
OKE&HD7C0,0:POKE&HD816,20
20 POKE150,7:POKE65497,0:CLS:CLE
AR2500:DIML$(78),GR(78),BT(78):P
RINT"CHECK DISK ON WHICH DRIVE ?
 ";:EXEC44539:D=VAL(INKEY$):PRIN
TD:IFD>3THEN20ELSEPRINT:PRINT"DO
 YOU WANT A PRINT-OUT ? ";:EXEC4
4539:PO$=INKEY$:PRINTPO$
30 PRINT:PRINT"CHECKING DISK ON
DRIVE";D"..."
40 POKE65496,0:DSKI$ D,17,2,AA$,
BB$:POKE65497,0
50 FOR QQ=1TO128:LE$=MID$(AA$,QQ
,1):IFLE$=CHR$(0)THEN60ELSENEXTQ
Q
60 GS=QQ-1:FORCG=1TOGS:IFMID$(AA
$,CG,1)=CHR$(255)THEN80ELSE70
70 NEXTCG:GOTO90
80 GR=GR+1:GOTO70
90 DF=0:FORX=3TO11
100 POKE65496,0:DSKI$ D,17,X,CC$
,DD$:POKE65497,0
110 FORK=1TO128STEP32:GOSUB120:N
EXTK:CC$=DD$:FORK=1TO128STEP32:G
OSUB120:NEXTK,X:GOTO270
120 SB$=MID$(CC$,K,16):AC=ASC(MI
D$(SB$,13,1)):IFAC=0THENII$="B"E
LSEII$="A"
130 I$=LEFT$(SB$,1):IFASC(I$)=0T
HENRETURNELSEIFASC(I$)=255THEN20
0ELSEDF=DF+1
```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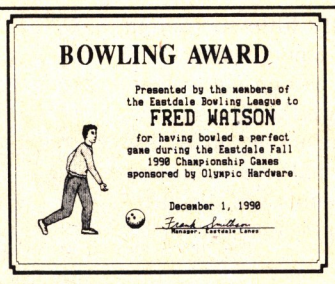
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```
140 Y=ASC(MID$(SB$,14,1))+1
150 GR(DF)=GR(DF)+1:Z=ASC(MID$(A
A$,Y,1)):IFZ<78THENY=Z+1:GOTO150
ELSEIFZ>192THENGOSUB160:GOTO170
160 BE=Z-192:BT(DF)=BE*256:RETUR
N
170 L$(DF)=LEFT$(SB$,8)+"."+MID$
(SB$,9,3)+STR$(ASC(MID$(SB$,12,1
)))+" "+II$+STR$(GR(DF))+STR$(((
GR(DF)-1)*2304)+BT(DF)):TG=TG+((
(GR(DF)-1)*2304)+BT(DF))
180 TT=TT+GR(DF)
190 RETURN
200 CLS:PRINT"DIRECTORY OF DRIVE
";D:PRINT:IFPO$<>"Y"THEN210ELSEI
FPEEK(65314)<>4THEN210ELSEPRINT#
-2,"  Directory of Drive";D:PRIN
T#-2
210 FORHM=1TODF:CL=CL+1:IFCL>13T
HENGOSUB230ELSEPRINT" ";L$(HM):I
FPO$<>"Y"THEN220ELSEIFPEEK(65314
)<>4THEN220ELSEPRINT#-2,TAB(10);
L$(HM)
220 NEXTHM:GOSUB230:GOTO240
230 PRINT:PRINT" STRIKE ANY KEY.
..":EXEC44539:CL=0:PRINT:RETURN
240 GF=GR:IFPO$<>"Y"THEN270ELSEI
FPEEK(65314)<>4THEN270
250 PRINT#-2:PRINT#-2,(GS+2)*230
4;"Bytes total disk space in";GS
+2;"clusters":PRINT#-2,TG;"Bytes
 in";DF;"user files in";GS-GR;"c
lusters":PRINT#-2,((GS+2)-GF)*23
04-TG;"Bytes in Directory and co
ntrol data"
260 PRINT#-2,GF*2304;"Bytes free
 in";GF;"clusters";CHR$(12)
270 GF=GR:PRINT:PRINT(GS+2)*2304
;"BYTES TOTAL DISK SPACE":PRINT"
 IN";GS+2;"CLUSTERS":PRINT:PRINT
TG;"BYTES IN";DF;"USER FILES":PR
INT" IN";(GS-GR)-HF;"CLUSTERS"
280 PRINT:PRINT((GS+2)-GF)*2304-
TG;"BYTES IN DIRECTORY":PRINT" A
ND CONTROL DATA":PRINT:PRINTGF*2
304;"BYTES FREE":PRINT" IN";GF;"
CLUSTERS"
290 CL=0:PRINT:PRINT" R)eview
  D)rive     Q)uit":EXEC44539:KY
$=INKEY$:IFKY$="R"THENPO$="N":GO
TO200ELSEIFKY$="D"THENRUNELSEIFK
Y$="Q"THEN300ELSE290
300 POKE65496,0:WIDTH32:RGB:CLS:
EXEC&HC000
```

Photo Database

by David Polonsky

16K Disk

Camera is a miniature database photographers can use to store information on disk about the shots they take. Simply run the program and follow the prompts. You are given options to Store data, Retrieve data or Quit the program. When retrieving data, enter the appropriate photo number. When you are finished, enter -1 to return to the menu.

As written, *Camera* stores the date, location, lens setting, camera and exposure setting for 36 entries. The file used to hold the data is named PHOTO.DAT. For this reason, you can store information for only one 36-exposure roll of film on any one disk. Try your hand at BASIC, and include a routine that allows you to store multiple rolls on one disk, perhaps by appending a roll number to the filename.

The Listing: CAMERA

```
1 'CAMERA -- PHOTO DATABASE
2 'BY DAVID POLONSKY
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
10 CLS:PRINT:PRINT
20 PRINT"STORE DATA, RETRIEVE DA
TA OR":PRINT"QUIT PROGRAM?":PRIN
T:INPUT "S, R  OR Q ==> ";A$
30 IF A$="S" THEN 100 ELSE IF A$
="R" THEN 200 ELSE IF A$="Q" THE
N END ELSE GOTO 10
99 END
100 REM store data
110 GOSUB 300:GOTO 120
120 ST=1
130 PRINT
140 PRINT "photo #"ST
150 PRINT:LINE INPUT"DATE (MM/DD
/YY):";DD$:LINE INPUT"PLACE:";PP
$:LINE INPUT"LENS:";LL$:LINE INP
UT"CAMERA:";CC$:LINE INPUT"EXPOS
URE:";EE$
160 LSET D$=DD$:LSET P$=PP$:LSET
 L$=LL$:LSET C$=CC$:LSET E$=EE$
170 PUT #1,ST:ST=ST+1:IF ST<=36
THEN 130 ELSE CLOSE #1:GOTO10
200 REM retrieve data
210 CLS:GOSUB 300
220 PRINT:INPUT"PHOTO #";ST
225 IF ST=-1 THEN CLOSE #1:GOTO1
0
230 GET #1,ST:PRINT:PRINT"DATE:"
;D$:PRINT"PLACE:";P$:PRINT"LENS:
";L$:PRINT"CAMERA:";C$:PRINT"EXP
OSURE:";E$
240 PRINT:GOTO220
300 CLS:OPEN"D",#1,"PHOTO/DAT",5
8:FIELD #1,8 AS D$,20 AS P$,10 A
S L$,10 AS C$,10 AS E$:RETURN
```

By the Numbers

by Bill Bernico

CoCo 3

Numbers is a nifty little subroutine that converts numeric input (without decimal points) into its written equivalent. Run it a few times to get the idea, then incorporate it into your BASIC programs. While the version printed here is intended for the CoCo 3, it shouldn't be too difficult to convert the routine for use with the CoCo 1 or 2.

The Listing: NUMBERS

```
1 'NUMBER SPELLER
2 'BY BILL BERNICO
3 'COPYRIGHT (C) DECEMBER 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
10 'THIS PROGRAM WILL SPELL OUT
    YOUR NUMBERED AMOUNTS WITH
    WORDS REPRESENTING THOSE
    AMOUNTS...JUST LIKE WRITING
    OUT THE AMOUNT ON A CHECK
20 GOTO170
30 P$="":IF N<=20 THEN P$=NU$(N)
:RETURN
40 TV=1000000000:GOSUB 90:IF Z$<
>"" THEN P$=P$+Z$+"BILLION "
50 TV=1000000:GOSUB 90:IF Z$<>""
 THEN P$=P$+Z$+"MILLION "
60 TV=1000:GOSUB 90:IF Z$<>"" TH
EN P$=P$+Z$+"THOUSAND "
70 N1=N:GOSUB 110:IF Z$<>"" THEN
 P$=P$+Z$
80 RETURN
90 Z$="":N1=INT(N/TV):IF N1<1 TH
EN RETURN
100 GOSUB 110:N=N-N1*TV:RETURN
110 Z$="":NH=INT(N1/100):N2=N1-N
H*100
120 NT=INT(N2/10):NQ=N2-NT*10
130 IF NH>=1 THEN Z$=NU$(NH)+" H
UNDRED "
140 IF NT<1 THEN 150 ELSE IF N2<
21 AND N2>0 THEN Z$=Z$+NU$(N2)+"
 ":GOTO 160 ELSE Z$=Z$+NT$(NT):I
F NQ>=1 THEN Z$=Z$+"-" ELSE Z$=Z
$+" "
150 IF NQ>=1 THEN Z$=Z$+NU$(NQ)+
" "
160 RETURN
170 CLEAR4000:ON BRK GOTO 330:DI
M NU$(20),NT$(10),NM$(4),ND(12),
MN$(12),LP$(30):FOR I=1 TO 20:RE
AD NU$(I):NEXT:FOR I=1 TO 10:REA
D NT$(I):NEXT:FOR I=1 TO 2:READ
NM$(I):NEXT
180 DATA ONE,TWO,THREE,FOUR,FIVE
,SIX,SEVEN,EIGHT,NINE,TEN,ELEVEN
,TWELVE,THIRTEEN,FOURTEEN,FIFTEE
N,SIXTEEN,SEVENTEEN,EIGHTEEN,NIN
TEEN,TWENTY,TEN,TWENTY,THIRTY,FO
RTY,FIFTY,SIXTY,SEVENTY,EIGHTY,N
INETY,HUNDRED,THOUSAND,MILLION,1
,1,1,1,1,1,1,1,1,1,10,150
190 CL=18:FOR I=1 TO 5:READ PX(I
),PY(I),PL(I):NEXT
200 DATA1,1,1
210 WIDTH 80:PALETTE 8,63:PALETT
E 0,0:ATTR 0,0:CLS:INPUT"ENTER A
MOUNT (NO DECIMAL POINTS)";AM:GO
SUB 220:GOTO 210
220 FOR I=1 TO CL:LP$(I)=STRING$
(130,32):NEXT:FOR I=1 TO 5
230 IF I=4 THEN N=AM:GOSUB 30:T$
=P$:XG$=RIGHT$(FP$,2)
240 MID$(LP$(PY(I)),PX(I),PL(I))
=T$:NEXT
250 FOR I=1 TO CL
260 IF LP$(I)=STRING$(130,32)THE
N 280
270 LOCATE 0,2:PRINT LP$(I)
280 NEXT:GOSUB 320:RETURN
290 Y$=MID$(STR$(Y),2)
300 IF LEN(Y$)<2 THEN Y$="0"+Y$
310 RETURN
320 LOCATE 5,20:ATTR 3,2,B:PRINT
"HIT ANY KEY TO TRY AGAIN";:EXEC
44539:ATTR 0,0:RETURN
330 ATTR 0,0:WIDTH 32:END
```

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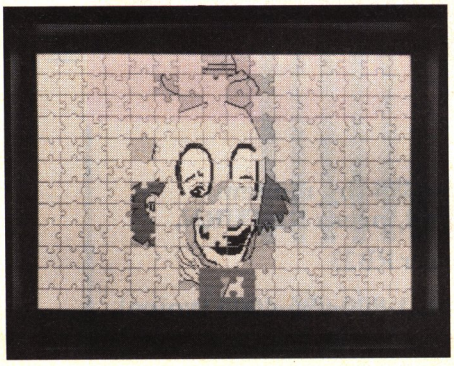
Potpourri CoCo 2 & 3

All Rick's Software

As shadows grow longer in autumn, car dealers offer "fantastic" deals, and garage and tag sales spring up like mushrooms. Bargain hunters should be thrilled to learn that Rick's Computer Enterprise has come out with an unbelievable offer by making *All Rick's Software* available in one neat package. The package contains many different types of programs such as: *CC3 Flags*, a computer version of *Risk*; *Master Dir*, a database manager for your disk files; *Gallery Maker*, a personalized program to view your own pictures on the CoCo; *Vocab*, a CoCo version of *Scrabble*; *Rainbow Indexes*, another database program that helps you locate information about articles that have appeared in THE RAINBOW; *Nib Compressor*, a graphics utility that compresses Hi-Res CoCo 3 pictures, thereby saving disk space; *Master Dir 3*, a rewrite of *Master Dir* for the CoCo 3; *Games for Friends*, four educational games; *Tetra*, an addictive game; *Steve's Pics*, 24 digitized pictures for your viewing pleasure; and *Puzzles*, a computer jigsaw puzzle. Regular readers of THE RAINBOW may recognize some of these titles and rightfully so, as all but the last four have already been reviewed. So this review only mentions those that have not already been raked over the coals.



Master Directory 3

Master Directory 3 is a database manager for disk directories. Once loaded, the Main menu allows the user to do the following: alphabetize filenames in each directory; clear all memory; delete filenames or entire directories; list all directories in the database; print hard copies of directories; report memory as to how many disks have been filed, how many filenames there are and how much memory is left; search for any specified or partial filenames; and write everything to disk.

Please note that the program and files occupy the entire memory area normally set aside for BASIC, and some of the data from *Master Dir 3* may be stored in locations needed by BASIC. For this reason, it is recommended that the computer be turned off for a few seconds after using this program. *Master Dir 3* is a machine language program.

Games for Friends

Games for Friends consists of educational programs. CANADA shows a map of the provinces of Canada and offers the option of either naming the provinces or their capitals. EUROPE has the same scenario as CANADA: You have the option to name the countries or their capitals. Note, in both CANADA and EUROPE, spelling counts, and you are charged with a wrong answer if you spell Czechoslovakia, or such, a bit creatively. SMARTY is a math tutorial for very young children or extremely bright dogs. A set of single-digit numbers are to be added or subtracted. If the answer is correct, a wolf appears. With the next answer a pot is placed in a room. Then a fire is started and the wolf is cooked. The program does not allow a wrong answer to be entered. WACKO is the computer version of a card game called *Racko*. The goal is to place 10 randomly stacked cards in descending order. The game can be played by up to four players.

Steve's Pics

Steve's Pics is an array of 24 digitized pictures ranging in subject matter from Jay Leno hawking chips, to horses, a guitar picker, Mt. Hood and a few close-ups of some female delights. A loader is conveniently supplied with the disk. The pictures can be loaded in black and white or in glorious color as seen on a composite or RGB monitor.

Tetra

Unless you have been in a deep coma for the last two years, you undoubtedly have heard of *Tetris*, an addictive little game that originated in Russia. The object of *Tetra* is to build a row of blocks across the screen by maneuvering random falling blocks into empty spaces. Once a row is completed, it disappears from the screen. You gain one level for every 16 completed rows. However, with each advance in level, the blocks drop more rapidly until they are a mere blur on Level 9. Movement is by arrow keys and nimble fingers.

Puzzles

Leaving the best for last, we come to *Puzzles*, a computerized version of a jigsaw puzzle. This is not a picture divided into 16 or 24 neatly cut rectangles. Rather, each piece has unique, irregularly cut edges that interlock with adjacent pieces. One of 188 playing pieces is shown in a box at the bottom center of the screen. You may move this piece, using the joystick, to any empty piece on the screen. If it fits, it is placed in its proper position. If it is not the right piece, you'll hear a buzz and have to try again. All playing pieces may be viewed in the center box by pressing the left/right arrow keys. You can get a quick start by looking over the pieces and placing the easy ones with the straight edges along the borders first. But it takes a while to fill in the rest of the puzzle. Although there are eight pictures provided with the game, the program comes with a utility that allows you to put your own pictures into the puzzle gallery. Of course, there is one drawback: If you get stuck, you can't blame the dog or cat for carrying off that key piece you can't find.

Everything listed, including a 36-page manual that adequately covers each program, plus seven disks (six of which are double-sided), is included in *All Rick's Software*. The entire package, which costs roughly $2.70 per side, is certainly at a bargain basement price.

(Rick's Computer Enterprise, P.O. Box 276, Liberty, KY 42539; 606-787-5783; $33 plus $2 S/H)

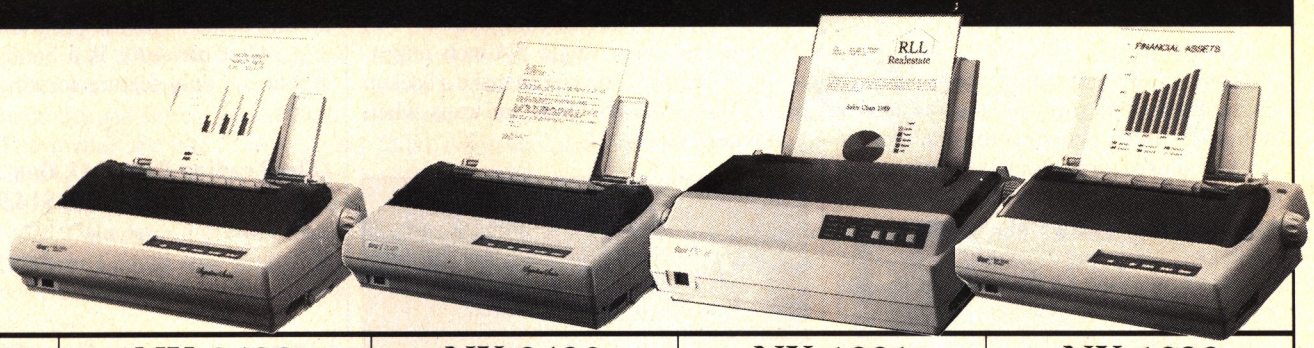
— George Aftamonow

Graphics Utility CoCo 3

HideScreen

A handy machine-language graphics utility written for your 128K/512K CoCo 3, *HideScreen* allows you to move any Hi-Res screen to any block of user memory and recall it with a simple BASIC USR command. *HideScreen* occupies a mere 328 bytes at Hex addresses $0E00 to $0F48. So when using this utility, make sure you don't overwrite this area with other programs.

star Printers of Choice



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Speed	222CPS	222CPS	180CPS	225CPS
Fonts	5 LQ 2 DRAFT 14 OPTIONAL	5 LQ 2 DRAFT 14 OPTIONAL	4 NLQ 2 DRAFT	4 NLQ 2 DRAFT
Graphics	9 MODES	9 MODES	7 MODES	7 MODES
Buffer	30K	7K	4K	16K
Color	Yes	No	No	Yes
Warranty	2 Yr.	2 Yr.	2 Yr.	2Yr.
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Using *HideScreen* is simple. You LOADM "HIDESCRN" but don't execute it. Next you set the DEFUSR statements as follows:

```
DEFUSR = &HE00 'STORE
DEFUSR1= &HF03 'RECALL
```

Since different HSCREENs require different numbers of memory blocks, the author includes a table showing the number of blocks required for the four HSCREENs available on the CoCo 3. Using this information, you could for instance hide an image on HSCREEN2 by using A=USR(4), because HSCREEN2 requires four blocks. To recall the image, you use A=USR1(32), which transfers the HSCREEN saved at the beginning of Block 32 to the screen. This transfer is quick — it takes roughly one second.

The supplied disk contains a demo program that shows how easy *HideScreen* is to use. The program does a memory check and loads 15 blocks of Hi-Res graphics. You can list the program to see how it works and model your own programs in a similar manner. The provided documentation is rather technical, but then so is the program. *HideScreen* can be very useful for programmers or those interested in learning more about what makes the CoCo 3 tick.

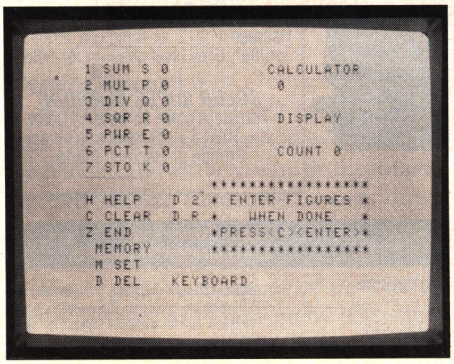
(N*Johnson Software, 5830A Reinke Drive, Crestview, FL 32536; $7.95)

— Robert Gray

Home Help	CoCo 1, 2 & 3

CoCo Calculator

CoCo Calculator is an easy-to-use program that turns your CoCo into a deluxe calculator. It can be used for addition, subtraction, multiplication, division, square roots, powers, rates, and percentages. Included are seven memories for the storage of constants or other intermediate answers that you want to recall for final calculations. A handy counter feature lets you keep track of the number of entries made into the calculator. You can set the display to round up to nine decimal places.



CoCo Calculator works on any CoCo and provides the user with a selection of monitor types — RGB, composite or TV. It's supplied on a single 5¼-inch unprotected floppy disk, so you can make a backup copy. The program loads and runs when you enter RUN "BOOT.

CoCo Calculator is an easy-to-use program that turns your CoCo into a deluxe calculator. It can be used for addition, subtraction, multiplication, division, and more.

The operating screen consists of a menu of all the math functions and memory storage options. You simply select which math function you want and enter the number to calculate. A highlighted box tells you what to do next. For example, if you have chosen the Sums function, enter the numbers you want to add, one at a time, and press ENTER after each entry. The calculated answer is shown in the upper-right corner of the display.

Once a final figure is obtained, you can store it in memory by pressing M. The number in memory then appears alongside its corresponding math function. The number can be recalled at any time by pressing the letter used to designate its math function. You can delete a memorized number by pressing D. You can also put numbers in memory by transferring them to storage using the menu option STO, for Storage. STO allows you to enter pi, at which time you will see the circle constant displayed.

The color of the screen is used to make you aware of which mode you are in. For instance, if the screen is blue, you are in one of the seven calculator modes and ready to enter calculations. If it's red, you are in the Main Menu mode and can select a math function from the displayed list. At any time you need assistance, you can activate the onscreen help. This same information is provided in the four-page instruction booklet that comes with the program.

CoCo Calculator is a handy program. About the only feature missing is a solar panel.

(The Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453; $14.95, $3 S/H)

— Jerry Semones

Utility	OS-9 Level II

WPShel

Wouldn't it be nice if you could take your favorite text editor, viewer, formatter and spell checker, and roll them up into one package with point-and-click menus? Wouldn't it be convenient to pull down a menu and choose the calendar or use the calculator in the same program? Well, this dream is now a real possibility, thanks to ColorSystems' *WPShel*. Not only does *WPShel* allow all this, it allows you to easily manipulate your text files and printing options as well.

To start, you need a CoCo 3 with at least 256K, OS-9 Level II, a disk drive, and the WindInt module from *Multi-Vue*. You also need a text editor of some kind. To really get the most out of *WPShel*, I recommend 512K, a second disk drive, a Hi-Res mouse, and also a text viewer, formatter and spell checker. You can use any type of monitor your editor and viewer will support.

I strongly urge the user to read the manual and readme file completely before setting up *WPShel*. I found the documentation quite unclear on how to make a disk that works with *WPShel*. As a result, I don't recommend this product for anyone not familiar with OS-9. I had pipe-device errors on startup when I first installed *WPShel* on my *Multi-Vue* and OS-9 system master. The manual never mentioned that you must have the pipe devices and WindInt in your boot file or how to accomplish this. Being well acquainted with OS-9, I was able to figure out how to make a boot disk that worked. Otherwise all you need to do is run the installation program and it automatically installs *WPShel* onto either an OS-9 or *Multi-Vue* disk. You then edit the environment file to accommodate your system and software.

WPShel comes with several patch files. Most are fixes to improve the operation of

device drivers, which I found would be used only as a matter of preference. The only necessary patch is if you use the `more` utility for a text viewer.

When you start *WPShel*, you see the main screen with the date, the day of week, the time, your disk directory (folder) and file with which you are currently working, your printer device and current screen-width settings. The menus are like *Multi-Vue*'s and include a Quit box. The Tandy menu lets you access the *Multi-Vue* Control feature, Calendar, Calculator and even fork a Shell. I wish that I could also change the printer speed from this menu, as I like to use 9600 baud.

The Documents menu lets you select, create, edit, delete and rename any file. One handy feature is the pop-up menu that allows a choice of working on the current document indicated on the main screen, selecting a new one, or entering a complete pathname when selecting a working document. Files can be selected with a mouse as well.

Since I write a lot and need to know how many words and lines are in my text, I really appreciate the Analyze feature. It even tells how fragmented (split up) the file is on the disk. You can exit *WPShel* in this and the Utility menu, too.

From the Print menu, you can print, view or format your text, and tell the printer to eject or go to the top of the page. When formatting your text, you can choose to send the output to a file, null device or the printer. If I had a spell checker, I could check the document, filter and display misspelled words, or look up a word, all from the Spell Checker menu. The Utility menu lets you change your working disk, drive, or folder, see how much space is left on your disk, and change your printer device and screen width. Other choices tell you what version of *WPShel* you have and allow you to shut down your system by parking the hard-drive heads. I don't have a hard drive and wish I could park the floppy drives to prevent banging into Track 0 on startup.

I have tried several programs with *WPShel* and found that not everything works in this environment. You cannot use programs that do not use windows. Programs like *DeskMate 3*, which uses a VDG screen, or *JTRead*, which requires a text window, will not work. *T/S Word* did not work well either. I must stress, however, that success lies in how familiar you are with the programs you use in *WPShel*. I found good results using *Sled23* or *Ed31* for a text editor, `more` for a viewer and `mroff` for a formatter.

Even though *WPShel* has it's disadvantages, I am impressed with its ability to integrate several text-processing programs into one shell. With the right software, *WPShel* is a powerful word-processing system for both the home user and professional alike. If you don't have any software to use with *WPShel*, Zack Sessions offers free copies of Shareware and Public Domain programs that work well in this environment (see the *WPShel* manual for details). All in all, I think this program is well worth the price.

(ColorSystems, P.O. Box 540, Castle Hayne, NC 28429; (919)-675-1706 Voice; (919) 675-1847 BBS; $22)

— Tika Carr

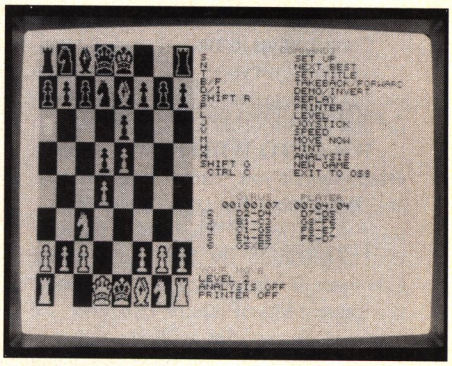
Game	OS-9 Level II

World Class Chess

My new chess opponent arrived in the mail today — an intelligent rival lacking any knowledge of the word humility. This is the way of most computer chess programs, and *World Class Chess* from Burke & Burke is certainly living up to the haughty standards.

***World Class Chess* for OS-9 allows you to run *Cyrus* from disk, without fiddling with a cartridge.**

Cyrus World Class Chess was first reviewed way back in August of 1985. This version is in the form of a Tandy ROM Pak, and it is an excellent program. Burke & Burke remedied the need to fiddle with a cartridge each time the game is to be loaded by enabling a transfer of the cartridge to disk. The chess program is not supplied on disk, just the means to do the transfer — you still need the original *Cyrus* cartridge to carry out the process. (*Cyrus World Class Chess*, #26-3064, is available for $29.95 via Express Order by calling 1-800-321-3133.) You'll also need a 256K (minimum) CoCo 3, a 35-track floppy disk drive, a Multi-Pak, and OS-9 Level II.



The transfer involves covering Pin 8 on the *Cyrus* ROM Pak and running an installation program, which is supplied on disk. Upon completion of the transfer, *World Class Chess* runs from disk under OS-9 Level II.

Not only has the media been changed, the program has been enhanced. Users can save games to and load games from a floppy disk or hard drive. Game logs can be sent to a printer or disk. There is improved joystick support, and the program now supports a Hi-Res mouse. All three *Cyrus* screens now appear on one graphics screen.

The chess board, even with all the graphics and menu displays, does not appear cluttered. The game pieces are represented by simple, though distinguishable, figures; not by the cheesy alphabet warriors I've seen in other programs.

The computer can play at 12 different skill levels. Even at the lowest levels it is no slouch. Its ability to look ahead a certain number of moves increases with each higher level. Sometimes on the higher levels, the only way I've managed to get out of a jam is by forcing the computer to move before it has finished accounting for the move. Even this unorthodox approach has proven futile at times. *Cyrus* is one tough cookie, insensitive to misfortune.

If you enjoying playing chess, I heartily recommend *World Class Chess*.

(Burke & Burke, P.O Box 733, Maple Valley, WA 98038; 800-237-2409; $29.95 plus $4 S/H)

— Tony Olive

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful, helpful and fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you want to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs that can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included in ASCII format on the tape or disk, using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those wanting more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.

Super Boot, a utility that allows you to configure your Disk BASIC system by entering `DOS`. It configures your system to the chosen printer baud, sets the drive step rate, and sets the number of tracks and sides for your drives. It can also set the text-screen colors on a CoCo 3. Requires a CoCo 1, 2 or 3 and a disk drive. *Sub-Etha Software, P.O. Box 152442, Lufkin, TX 75915, (409) 639-3842; $14.95*

TV, for OS-9 Level II, is a simple utility program that can be used to view text files. You may use it as a replacement for the `list` utility. It can also be used as a text viewer in the *WPShel* environment. *TV* allows for displaying a text file one screen at a time, and allows for paging up and down within the file. *TV* works with files of any size and on any screen type. The display also adjusts for any size window. Requires OS-9 Level II and a disk drive. *MV Systems, P.O. Box 818, Arvada, CO 80001-818, (303) 420-7777; $8.95 plus $2.50 S/H.*

Gems, a second-generation *Tetris* game that requires the player to match colored gems as they drop down the screen. Getting three or more of one color in a straight or diagonal row removes those gems from play. The colors can be rotated to the player's advantage. *Gems* features both keyboard and joystick control, plus stereo sound effects through the Orchestra-90 cartridge, and a scoreboard. Requires a CoCo 3 and a disk drive. *Eversoft Games Ltd., P.O. Box 3354, Arlington, WA 98223, (206) 653-5263; $24.95 plus $2.50 S/H.*

Duo Deck Solitaire, contains two double-deck solitaire games. The first is *Sly Fox*, in which the player must manipulate twenty wastepiles in order to keep key cards in play to build eight foundations. The second game is *Windmill*, also known as *Propeller*. While a good bit of skill is required for this game, there is also the element of chance. System requirements are a CoCo 3, a disk drive, and a joystick or mouse. *Eversoft Games Ltd., P.O. Box 3354, Arlington, WA 98223, (206) 653-5263; $19.95 plus $2.50 S/H.*

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

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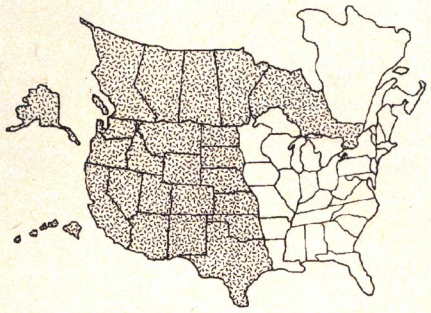

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Magazine Source: Due to many inquiries, the source code for the magazine graphic shell is being provided as an informational tool. Included is the actual Basic09 source code and compiled modules on disk, as well as documentation and a printed copy of the source code.

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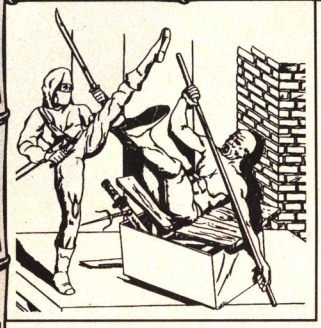

KYUM-GAI TO BE NINJA

OS-9

Kyum-Gai: to be Ninja (OS-9 Version) is the culmination of a project started almost a year ago. The talents of *Glen R. Dahlgren* (RS-DOS game writer for Sundog Systems), *Kevin Darling* (a legend for his work in OS-9), and *Eddie Kuns* (author of KBCom) have been pooled to create a masterpiece of game software under the OS-9 operating system. Fast martial arts action with outstanding graphics, great digitized sound effects, and incredible animation are featured in this arcade game, all in the OS-9 environment.

Always wanted to play the great CoCo 3 games but didn't want to sacrifice your OS-9 features? ***Multitask while playing*** Kyum-Gai. ***Have multiple Kyum-Gai's*** running in memory. Don't worry about switching windows, because Kyum-Gai: OS-9 auto-pauses, to wait for your return.

Put simply, this is an unprecedented piece of software for the CoCo; a landmark game sure to be a major part of the Color Computer history. Don't miss out on this game! Req. 512K CoCo III with OS-9 Level 2 and joystick. **$29.95**

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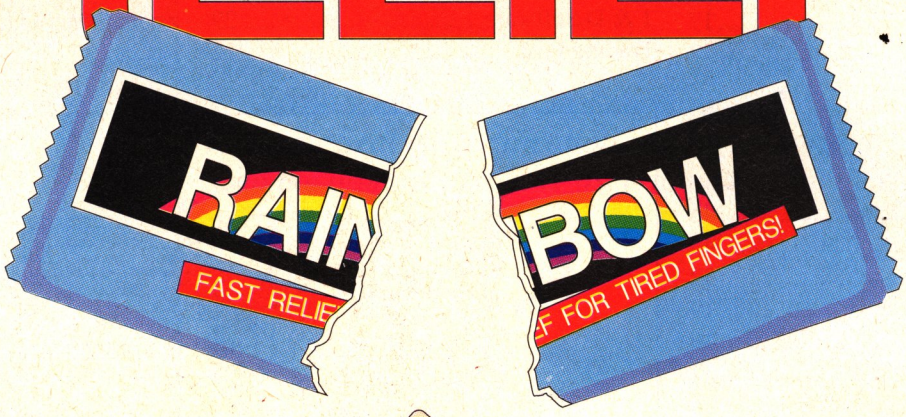

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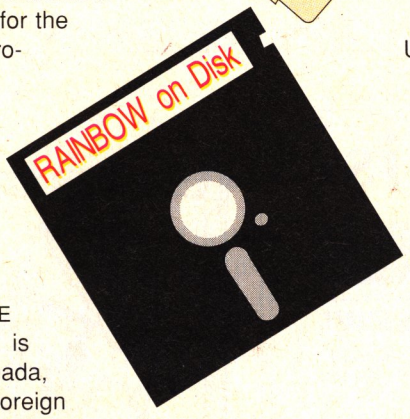

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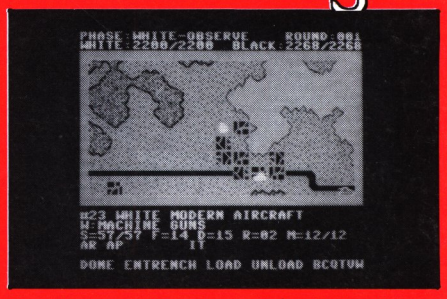

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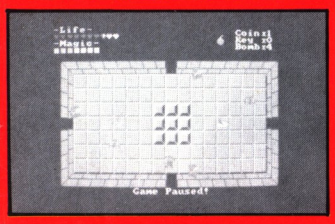

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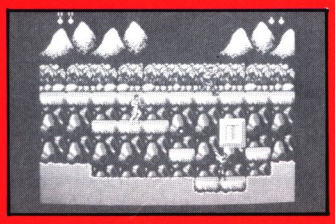

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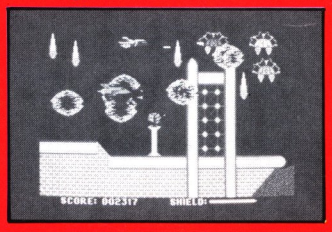

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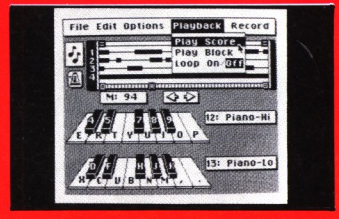

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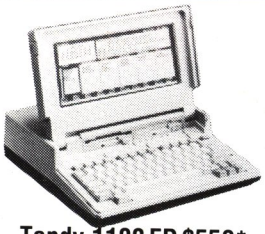

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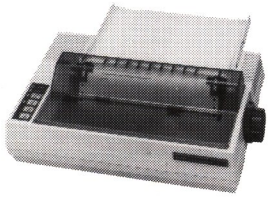

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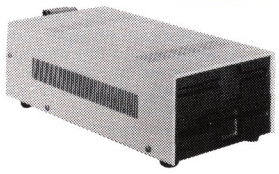

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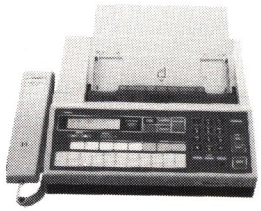

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